# Thermal Efficiency of Courtyards for Residential Buildings in Iraq

By

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## Dedication

This work is dedicated to my beloved home country: Iraq

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## Signed author's declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Doctoral College Quality Sub-Committee.

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**Thermal efficiency of courtyards for residential buildings in Iraq**

Omar Arshad Al-Hafith

# Abstract

This thesis investigates adopting the courtyard pattern in Iraq to provide a thermally efficient architectural solution that contributes towards solving the housing challenges in the country. As a result of more than three decades of wars and instability, the country suffers from having a large housing shortage and a major production shortfall. This shortage is estimated at around 1.0 million housing units, which is equivalent to one-quarter of the total housing stock in the country. The current housing production is around 30000 housing units per annum only, which, therefore, does not alleviate the housing needs in the country. The country has developed a new national housing policy and adopted the mass construction of multi-family buildings as an architectural solution towards solving the large quantitative problems. This research aimed to investigate the potential thermal efficiency of courtyards with considering this housing context.

To achieve this aim, this research started by investigating the housing context in Iraq. It, then, focussed on the use of courtyards in modern multi-family residential buildings in Iraq, and explored the level of thermal comfort that courtyards can offer to Iraqi residents. The study developed a novel Courtyard Thermal Usability Index (CTUI) to quantify the ability of courtyards to offer a thermally comfortable environment to occupants. CTUI is the fraction of thermally comfortable hours in a courtyard to the total occupation hours during a specific period. To underpin the quantification, the research conducted a thermal comfort survey in Iraq and carried out a series of simulation experiments. The aim of the survey was to determine the thermal comfort limits of Iraqis to be used in judging the thermal efficiency of courtyards. The aim of the simulation was to explore the thermal conditions of courtyards in Iraq. Two simulation tools, Envi-met and IES-VE, were used to determine the thermal conditions across a search space of 360 different courtyard variants. The simulation experiments were conducted for Baghdad and six other Iraqi cities of different climatic conditions. The tested courtyards represent a wide range of possible courtyard geometric configurations, which enabled the research to provide a good overview of possible thermal conditions of courtyards in Iraq. The survey results indicate that the minimum and maximum thermally comfortable globe temperatures for Iraqis in winter and summer are, respectively 14 °C and 35 °C. Within this comfort range and during the daily occupation hours, which are from 8:00 to 22:00, the annual CTUI of courtyards, in Baghdad, ranges between 0.16 and 0.38. Expressed in a different way, courtyards can offer 875 - 2078 comfortable hours out of 5470 occupation hours per annum. The rest are not comfortable hours, mostly due to overheating. In comparison to current typical urban settings, courtyards offer higher levels of thermal comfort. The most effective geometric property on courtyards' thermal conditions and the level of thermal comfort in courtyards is the width/height ratio. This ratio has a significant impact on the insolation level and Mean Radiant Temperature, which highly affect the thermal sensation of occupants.

In conclusion, this research suggests that the courtyard can help to provide thermally comfortable environments for occupants in Iraq. However, other passive and active strategies need to be considered as courtyards are not comfortable for around two-thirds of the occupation hours around the year. This research advances the knowledge on the acceptable thermal comfort conditions in residential buildings in Iraq through presenting the first complete thermal comfort survey in residential buildings in the country. This research presents the first attempt towards a holistic and comprehensive assessment of thermal comfort in courtyards.

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# Chapter One …… Introduction

# Chapter 1 - Introduction

This research investigates the ability of courtyards to offer thermally comfortable environments in Iraq. Thermal comfort is one of the first residential priorities of Iraqis. Iraq has harsh climatic conditions during most of the year (Aljwadi & Alsangari, 2010; Hasan, 2016) and people suffer from the electricity supply frequent interruptions that have existed in the country since the 1990s (Al-juboori, 2015; UNDP-Iraq, 2012). Many studies have been advocating adopting the courtyard pattern in modern built environments to satisfy a number of residential requirements, including having thermally comfortable buildings. Scholars have experimentally proven that courtyards can help to create more thermally comfortable buildings than non-courtyard building patterns. Furthermore, courtyards offer an additional space to the building occupants that is not conditioned, but which may be used for significant amounts of time (Shaheen & Ahmad, 2011; Al Jawadi, 2011).

However, courtyards, as with other possible building patterns, need to be adopted whilst considering the housing context in the country. Iraq experiences a large housing problem. It suffers from having a housing shortage of around one million units, which is equivalent to around 25% of its current total housing stock. At the same time, there is a large production shortfall: the total production is around 30000 housing units per annum, while the required annual production to satisfy the housing shortage and the annual growth needs in ten years are around 200000 units. Aiming to solve these challenges, the country has adopted the mass construction of multi-family residential buildings to have progressive housing production. Housing policy-wise, the public sector has been developing large housing projects alongside supporting the private sector to gradually become the leading producer in the country (Figure 1. 1) (Iraqi Ministry of Construction and Housing 2010; Iraqi Ministry of Planning 2013; Iraqi Ministry of Construction and Housing 2017).

Images have been removed due to Copyright restrictions.

Figure 1. 1. Governmental mass multi-family housing construction in Iraq

Source: Iraqi Ministry of Construction and Housing

Accordingly, before exploring the thermal efficiency of courtyards, this research started by investigating the housing context in Iraq and exploring the applicability of the courtyard pattern in the country in comparison to other building patterns. The thermal efficiency of courtyards was determined through considering the amount of time, in hours, courtyards can offer a thermally comfortable environment to occupants to perform their domestic activities. For this purpose, the research developed the Courtyards Thermal Usability Index (CTUI) to determine the potential usability extent of courtyards in Iraq based on thermal comfort. CTUI is the fraction of thermally comfortable hours in a courtyard to the total occupation hours during a specific period, such as a month, a season or a year. The value of this index ranges between 0.0

and 1.0. The higher the value is the higher thermal comfort level and, as a result, the greater usability extent. To determine the CTUIs of courtyards in Iraq, this study determined the thermal comfort limits of Iraqis and the possible range of thermal conditions of courtyards in the country.

## 1.1. Research aim and objectives

The overarching aim of this research is to investigate the thermal efficiency of courtyards for residential buildings in Iraq. To achieve this aim, this research worked on the following objectives:

- Objective 1: Exploring the applicability of courtyards within the housing context of Iraq.
- Objective 2: Determining the thermal comfort limits of Iraqis.
- Objective 3: Determining the possible thermal conditions of courtyards in Iraq.

## 1.2. Research methodology

This research conducted an intensive literature review and adopted quantitative research methodology. It conducted two quantitative surveys and a set of simulation experiments. The first survey aimed to support exploring the applicability of the courtyard within the housing context in Iraq. It included comparing the efficiency of the courtyard pattern with other building patterns in satisfying the preferences of Iraqis and the various housing requirements in the country. The second survey was conducted to determine the thermal comfort limits of Iraqis to be used in judging the thermal efficiency of courtyards. This survey was conducted with considering established comfort surveys and a thermal comfort survey guide authored by three pioneers in the field of thermal comfort (Fergus Nicol, Humphreys, & Roaf, 2012). The simulation experiments employed two simulation tools, Envi-met and IES-VE, in order to obtain a comprehensive analysis of the thermal conditions of courtyards. These simulation tools were selected following an examination of their accuracy in simulating courtyards' conditions, including comparing simulation results with real-life thermal conditions of courtyards in Baghdad (Almhafdy, Ibrahim, Ahmad, & Yahya, 2013; Ridha, 2017). Three hundred sixty courtyards of different geometric configurations were tested to show a wide range of possible thermal conditions in courtyards in Iraq. Studies have shown that the thermal performance of courtyards is affected by its geometric properties: width, length, height and orientation (Muhaisen & B Gadi, 2006; Tablada, Blocken, Carmeliet, De Troyer, & Verschure, 2005). Based on the established comfort limits and simulation results, CTUIs of the 360 examined courtyards were determined in order to draw conclusions on the level of thermal comfort courtyards can offer to occupants. To determine the possible positive/negative impact of introducing a courtyard to a building on its thermal efficiency, the research compared the thermal conditions of the examined courtyards with thermal conditions of typical residential street spaces in Baghdad. Studies have shown that courtyards offer moderated outdoor environments to indoor spaces to interact with instead of directly facing outdoor climatic conditions through the modern urban spaces (Soflaei, Shokouhian, Abraveshdar, & Alipour, 2017). Accordingly, if courtyards can offer a more thermally comfortable environment than typical outdoor spaces, the whole courtyard building will potentially be more thermally efficient than a non-courtyard one.

## 1.3. Research contribution to knowledge

The contribution to the knowledge of this research is as follows:

- Determining the residential thermal comfort limits of Iraqis.
- Assessing the thermal efficiency of courtyards in Iraq with considering the thermal comfort limits of Iraqis.
- Developing an index to assess the thermal efficiency of courtyards: Courtyard Thermal Usability Index (CTUI)

## 1.4. Thesis overview

This thesis consists of six chapters. The first chapter presents an introduction to the thesis. The second chapter explores the housing context in Iraq. The third, fourth and fifth chapters elaborate on the conducted research work to determine the thermal efficiency of courtyards in Iraq. Chapter six presents the research findings and conclusions.

- <u>Chapter 1 – Introduction</u>

  This chapter presents an introduction and an overview of the conducted research study. It summarises the conducted research work, aims and objectives, methodology and contribution to knowledge.

- <u>Chapter 2 – Context of using courtyards in Iraq</u>

  This chapter elaborates on the applicability of courtyards within the housing context in Iraq. This includes exploring the housing challenges and requirements in the country, the adopted housing policy and construction approach and the potential contribution of courtyards in comparison to other building patterns.

- <u>Chapter 3 – Courtyards and thermal comfort</u>

  This chapter reviews previous literature on the subjects of thermal comfort and the thermal performance of courtyards. It defines the notion of thermal comfort and explores the thermal comfort limits of Iraqis to be used in judging the thermal efficiency of courtyards. Furthermore, the chapter explores the principles, elements and variables that govern the thermal performance of courtyards to be used in determining thermal conditions of courtyards in Iraq.

- <u>Chapter 4 – Research Methodology</u>

  This chapter develops the research methods needed to determine Iraqis' thermal comfort limits and courtyards' thermal conditions. It elaborates on the development of the thermal comfort survey and the use of simulation tools to conduct simulation experiments.

- <u>Chapter 5 – Results: assessing the thermal efficiency of courtyards in Iraq</u>

  This chapter presents the results of the thermal comfort survey and simulation experiments. This includes determining the thermal comfort limits of Iraqi people and thermal conditions in courtyards in Iraq. Furthermore, the chapter correlates the results of the comfort survey and the simulation experiments in order to determine the Courtyard

Thermal Usability Index (CTUI) to draw conclusions on the thermal efficiency of courtyards in Iraq.

- Chapter 6 – Conclusions & Recommendations
  This chapter presents the conclusions and recommendations of the research and suggests future research work. It summarizes the findings of the thesis in the form of a thermal efficiency guide for designing courtyard spaces in Iraq.

# Chapter Two …… Context of using courtyards in Iraq

# Chapter 2 - Context of using courtyards in Iraq

The courtyard pattern is one of the oldest architectural forms. It had been used in hot climate regions around the world since the first civilisations in Mesopotamia, Egypt, India and China until the middle of the last century (Muhaisen & Gadi, 2005; Sthapak & Bandyopadhyay, 2014; Khan & Majeed, 2015). Typically, a courtyard building has an open space in the core of the building, which provides natural lighting and ventilation for indoor spaces, regulates the thermal conditions of buildings, and offers a private open space to occupants (Edwards, 2006). However, for various reasons, including the development of construction materials, the changing of architectural styles, and social, cultural and political changes (Al-Thahab, Mushatat, & Abdelmonem, 2014; Mohamad, 2012), it has been replaced with new patterns of buildings, such as the detached and semi-detached buildings. The new patterns depend primarily on mechanical air-conditioning systems to provide a comfortable indoor environment. This tendency has led to an increase in the running costs, the energy consumption and the negative impact of buildings on the environment (Foruzanmehr, 2015). Aiming for more environmentally and energy-efficient buildings, studies have investigated the thermal performance of the courtyard pattern in hot arid and hot humid climate regions. From favourable results, many studies have advocated readopting the courtyard pattern for being a thermally efficient solution for hot climates (G Manioğlu & Oral, 2015; Al-Jawadi, 2011). This study investigated the thermal efficiency of courtyards for Iraq through determining the level of thermal comfort it can offer to occupants.

However, as Iraq experiences a challenging housing situation, before investigating the potential thermal efficiency of courtyards, this research explored the potential applicability of courtyards in the country. The research determined the potential impact and response of courtyards to the current housing requirements and challenging situation in the country. This exploration included three steps. First, the research explored the housing challenges and requirements in Iraq. Second, it explored the Iraqi housing policy and the adopted construction approaches in the country. Third, it examined the correspondence of the courtyard pattern with the adopted housing approach in the country, to address the housing challenges, in comparison to other possible building patterns. This chapter presents these three exploration steps in three sections:

- Housing challenges and requirements in Iraq.
- Housing policy and construction approaches in Iraq
- Courtyard correspondence with housing context in Iraq.

## 2.1. Housing challenges and requirements in Iraq

The housing challenges and requirements represent the baseline for determining the applicability and possible advantages or disadvantages of courtyards in Iraq. Exploring the housing sector challenges helps to determine what aspects need to be considered when using courtyards to contribute towards solving the housing problems. Exploring the residential requirements of Iraqis helps to determine the aspects that need to be considered to satisfy the residential requirements and preferences of Iraqis.

### 2.1.1. Iraqi housing sector challenges

The Iraqi National Housing Policy (INHP) issued in 2010, supported by other studies, including the PADCO study in 2006, defines seven problematic areas that impact the housing sector development in the country. The housing sector suffers from weak housing production, lack of urban lands and construction materials, inefficient infrastructure and financial system, housing stock deterioration and growing informal settlements (Figure 2. 1) (Iraqi Ministry of Construction and Housing, 2010)(PADCO, 2006). This research explored the first five problematic fields for their potential direct impact on proposing specific architectural solutions and elements, including using courtyards. The problems associated with informal settlements and the level of housing stock deterioration do not have direct implications on developing new housing designs.

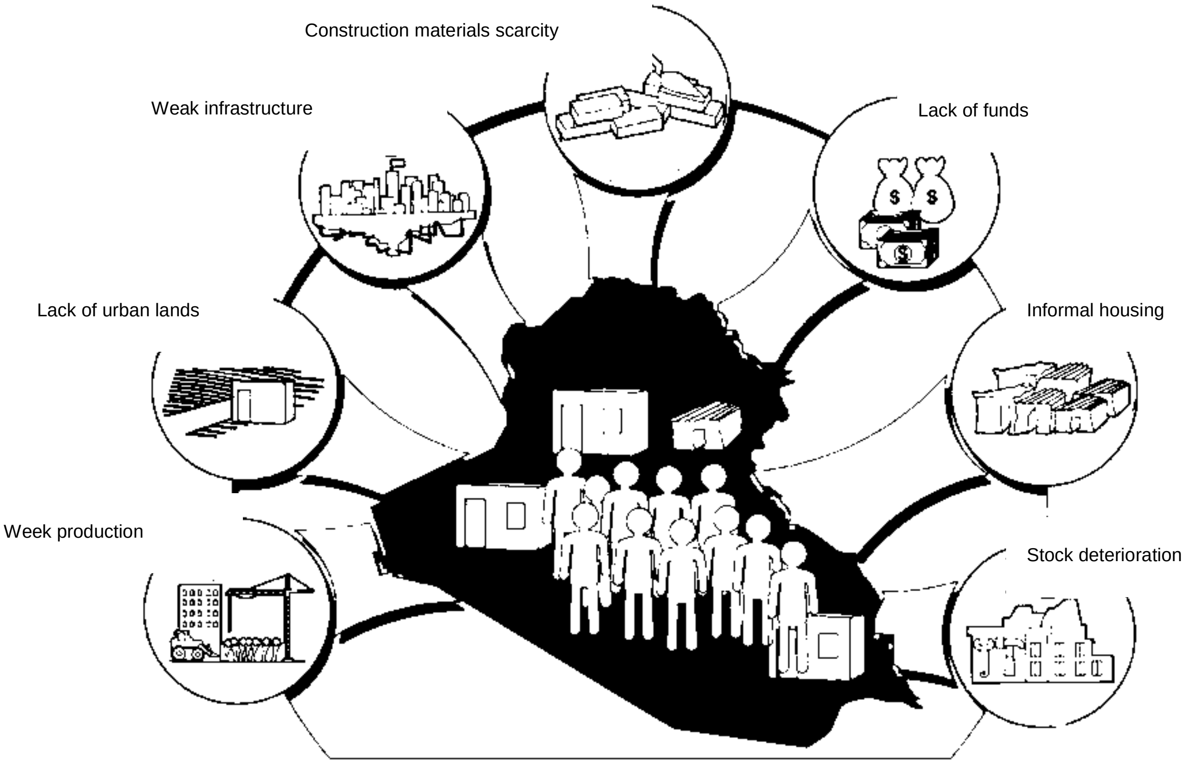


Figure 2. 1. Housing sector challenges in Iraq
Source: the researcher depending on (Iraqi Ministry of Construction and Housing, 2010)(PADCO, 2006)

A. Weak housing production

Housing production in Iraq has passed through various stages during the last 60 years. Due to intensive governmental construction and planning efforts, the housing production in the country was significantly developed, especially during the period between the 1970s and the beginning of the 1980s (Al-Adhami, 1975; Al-Hamawandi & Al-Qaisi, 2010; Shaikley, 2007) (Figure 2. 2). The annual housing production reached its ever highest rate during this period, which was 50000 dwellings per annum. This led to improving the housing conditions in the country. Informal settlements decreased from 79.4% of the housing stock in 1956 to 56.9% in 1965, 44.0% in 1977 and 10.0% in the nineteen eighties (See appendix A for further details) (Iraqi Ministry of Construction and Housing, 2010; Al-Rahmani, 1986; Yousif, 2012).

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Figure 2. 2. Governmental housing developments in Baghdad - 1980s
Source :( أدارة مجمع الصالحية السكني Facebook, 2013; شارع حيفا Facebook, 2014)

The progress in developing the housing sector has not continued. A decline in the development efforts started in the mid-1980s, primarily, because of the Iraq – Iran war. The situation became worse after the Gulf War in 1991 and the UN sanctions (1990-2003) (Al-Shock, 2008; Alqatrani, 2014; Nashoor, 2012). The housing production reached its lowest level during this period in 1996 with only around 400 dwellings constructed in the whole country. After that, the production increased gradually to around 24000 in 2002 due to improvements in the economic conditions in the country (PADCO, 2006; Shaikley, 2007). In 2003, the US-led collation invaded Iraq, and the housing production deteriorated once again, but it has gradually recovered to be around 32000 per year in 2012 (Shaikley, 2007; Central Statistical Organization(m), 2014). Currently, the overall annual production in the country is estimated to be around 30000 dwellings while the estimated annual need is around 200000 units (Figure 2. 3) (Central Statistical Organization(m), 2014; Iraqi Ministry of Housing, 2010). As a result of this large production shortfall, the housing shortage has been increasing in the country since the 1990s. The Iraqi formal housing authorities and studies, such as (Al-Masaudi & Al-Saadi, 2012), estimate the current housing shortage to be around 1.0 million housing units, which is equivalent to around 25% of the total housing stock in the country. These numbers indicate a large quantitative problem in the country. Accordingly, the first aspect to be considered regarding the courtyard pattern in the country is its possible contribution towards solving the housing production shortfall in Iraq.

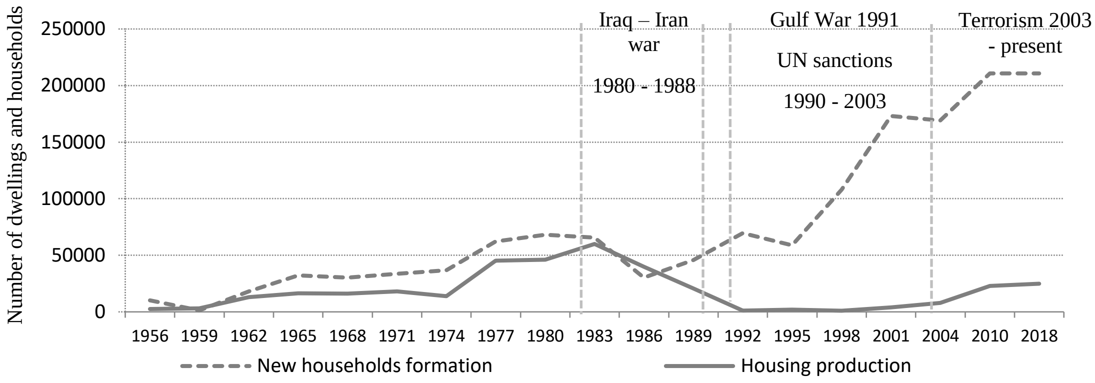


Figure 2. 3. Annual housing production and households formation in Iraq (1956-2018)
Source: the researcher depending on (Al-Adhami, 1975; Al-Rahmani, 1986; Salem, 2011)
(Refer to 'Appendix A. Housing conditions in Iraq' for further details)

B. Lack of urban lands

Urban lands represent one of the primary resources for the housing sector, and its unavailability is one of the significant obstacles that may hinder the housing sector progress. In Iraq, the government has typically been responsible for planning, developing and delivering the urban plots. It has kept distributing building plots to people as one of the strategies in its subsidising housing policies. Within this context, and as land is state-owned by default, around two million urban plots were delivered between 1980 and 2000 (PADCO, 2006). Hundreds of thousands were delivered and promised to be delivered in 2013 (Prime Minister Office, 2013). In many cases, this has been done without proper planning of cities expansion (UN-HABITAT, 2003). This policy of urban land distribution has led to a situation with around 1.0 million vacant urban plots in Iraqi cities, especially in peripheral areas (Figure 2. 4) (Iraqi Ministry of Construction and Housing, 2010). Although this is supposed to make residential plots affordable for people, studies show that urban land availability still negatively affects the housing sector development (PADCO, 2006). This is for two reasons. First, a large number of the available lands are owned by individuals who hold them for investment purposes only. Second, because of the unplanned distribution of lands, a high percentage of the available plots are unusable because of the lack or the severe limitations of local infrastructure services (PADCO, 2006; Iraqi Ministry of Construction and Housing, 2010). This exploration suggests that it is helpful to determine the advantages or disadvantages of adopting the courtyard pattern on land-use efficiency.

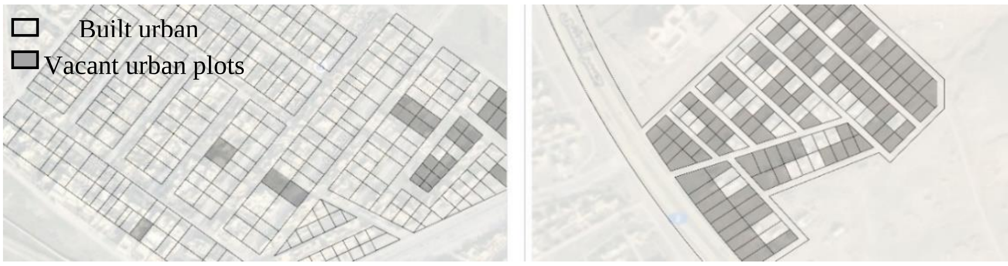


Figure 2. **4.** Vacant plots in a central (left) and peripheral areas in Mosul (right)
Layouts were drawn by the researcher depending on (Google map)

C. Insufficient infrastructure services

Infrastructure, including electricity, water supply, sanitation, waste collection and transportation, is essential to give a residential environment the ability to support its occupants with healthy living conditions. Insufficient infrastructure, in terms of quality and quantity, may threaten the health and productivity of people (Graham, 2010). In Iraq, the infrastructure was considered efficient until 1990. It has deteriorated since that time as it was severely damaged by the Gulf war in 1991 and the US-led invasion in 2003. Furthermore, it suffered from weak development and maintenance during the period of the UN sanctions (UN-HABITAT, 2003; UNDP-Iraq, 2012). Currently, the national electricity network satisfies around 50% of the local needs, which forces people to manage private or shared generators to supply electricity for significant parts of the day (Al-juboori, 2015; PADCO, 2006). The water supply system struggles with problems of quality and quantity. The sanitation system hardly manages to serve Baghdad, the capital, with many defects. The majority of houses in the country use on-site septic tanks (Al-Alaak & Al-Hadawe, 2007; UN-HABITAT, 2003; United State Department of State, 2003). This challenge implies that, in adopting any architectural approach or solution, having efficient use of infrastructure services need to be considered, which is applied to the notion of using courtyards.

D. Construction materials scarcity

One of the main requirements for developing the housing sector is the availability of construction materials and products. In Iraq, bricks, cement blocks, natural stone and steel are the main construction materials (Juma & Abdul Hussein, 2001; PADCO, 2006). Currently, they are obtained in two ways: the first one is through production by the local industry, and the second one is by importing them from abroad. The local industry suffers from the shortage of energy and from being underdeveloped and damaged during the wars, which prevent them from providing sufficient supply for the local market (M. I. Mohammed, 2010; PADCO, 2006). This has led to the import of the majority of the basic construction materials. For instance, in 2012, Iraq imported 4 million tons of steel, about 65% of the local need, and 12 million tons of cement (State Trading Company for Construction Materials, 2011; Taib, 2014). This situation has increased material costs significantly, especially after 2003 (Central Statistical Organization, 2010; Iraq Building Materials Market Analysis, 2005; Juma & Abdul Hussein, 2001). As a result, currently, the costs of construction materials represent around 65% of the total construction costs in the country (Juma & Abdul Hussein, 2011; PADCO, 2006). An efficient use of construction materials thus is an essential aspect to be considered and examined when proposing architectural solutions, including courtyards.

E. Lack of finance

Finance is one of the main factors in implementing housing policies. It is the keystone that enables the housing sector to grow and develop (Al-Mutlaq, 2011; Ekram & Almlahoiesh, 2008). In Iraq, financial resources for housing construction are provided in two ways: the first one is by the public or private financial institutions, and the second way is by households (PADCO, 2006). The public sector institutions deliver long term low-interest loans for housing construction purposes (Al-Mutlaq, 2011; Ekram & Almlahoiesh, 2008). However, studies show that public funders are inexperienced in dealing with low-income households and suffer from scarcity in capacity, shortage in supply, difficult mortgage conditions, deficiency in collateral and inefficient administration procedures (Al-Mutlaq, 2011; Mumtaz, 2009; PADCO, 2006). Regarding the private funding institutions, there are only a few of them, and their role has been limited to the provision of a limited number of short-term loans (Iraqi Ministry of construction and housing 2010; PADCO, 2006). They cannot compete for the “easy loans” programs of the public sector and suffer from the lack of capital and collateral (Nagy, 2006). As a result of this situation, less than 8% of the households that had built a house had obtained funds from financial institutions, while the remaining 92% had depended on their savings or loans from relatives and friends (PADCO, 2006). Within this context, added to the other challenges that raise the housing costs, housing affordability becomes an essential factor to be considered when proposing investing the courtyard pattern in developing architectural solutions for residential buildings in Iraq.

### 2.1.2. Residential requirements of Iraqis

The Iraqi housing sector challenges indicate the first set of requirements that need to be explored and considered when proposing architectural solutions, including using courtyards. The other set includes the residential requirements of Iraqis. Buildings are supposed to be built and designed to provide a suitable environment for users to perform their activities, which include, for instance, providing sufficient spaces, suitable indoor temperature, natural lighting and ventilation (Preiser, 1989). As with exploring the Iraqi housing sector challenges, this section explores relevant residential needs of Iraqis that need to be considered when adopting courtyards.

A. Spatial requirements

Spatial requirements include two sub-categories: providing efficient and sufficient spaces, and providing a flexible layout to accommodate the changing needs of occupants (Abod, Hussain, & Al-khafaji 2011). Regarding the first category, architectural solutions need to be developed whilst considering relevant spatial standards established by relevant authorities. The Iraqi Housing Manual has been issued to define minimum areas of spaces in correspondence with the size and type of housing units (AL-Temimi & Al-Saidi, 2014; State Commission for Housing, 2010) (Refer to Appendix B for further details). The second aspect of the spatial requirements is the ability of housing units to accommodate the changing requirements of occupants. The significance of this feature is related to its impact on the functional efficiency and working-age of buildings, as it enables buildings to satisfy both predictable and unpredictable future requirements (Aldewachi, Thabit, & Yonis, 2007; Karofa, Nayef, & Rezouki, 2011).

B. Environmental comfort requirements

This group of requirements concerns the factors of sound level, natural ventilation, humidity, natural lighting and thermal comfort (Abod, Hussain, & Al-khafaji, 2011). However, within the range of these factors, studies stress the priority of thermal comfort over the other factors. The main reason is that people in Iraq suffer from harsh climatic conditions that make having thermally comfortable indoor environments a priority (Figure 2. 5) (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Aljwadi & Alsangari, 2010; Hassan, 2013). Providing thermal comfort has been more problematic and of higher importance because of the unreliable electricity supply since the 1990s (Al-juboori, 2015). During the previous years, there have been demonstrations in the country because of this issue, especially in summer, as people find themselves facing severe climatic conditions without reliable electricity supply to run air-conditioning systems (SkyNews, 2018).

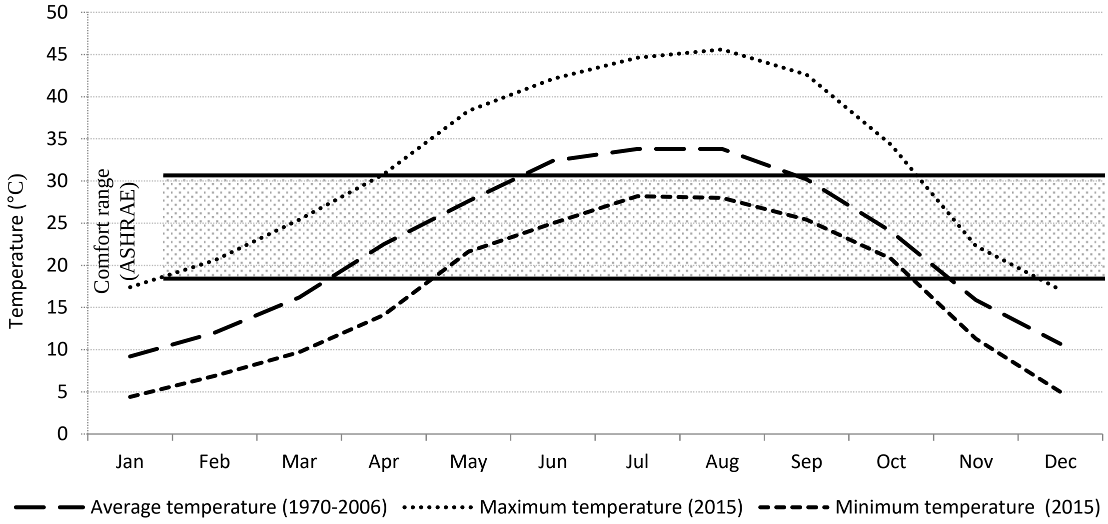


Figure 2. 5. Thermal conditions in Iraq and ASHRAE comfort range
Source: the researcher depending on the (Iraqi Metrological Organization) and (Al-Shammari, 2013)

C. Social and Psychological requirements

This group of requirements is related to the behaviour and values of residents, which may differ from one place to another and from one culture to another (Abod et al., 2011). The main two relevant aspects that have been stressed in Iraq are privacy and aesthetical features.

Privacy is related to the degree of freedom for a person to be away from the surveillance of others , which is predominantly related to visual relations (Shukur & Hameed, 2004). A high level of privacy is one of the social and cultural requirements in Iraq. Its impact can be seen in residential buildings in the country. In the case of the traditional houses, the whole building is opened to indoor courtyards and closed to the outside, which provides a high level of privacy for occupants. In addition, traditional houses use indirect entrances and particular kinds of artefacts on windows to prevent indoor spaces from being seen from the outside (Figure 2. 6) (Alomari 2008; Mohamad, 2012). Modern outward-oriented residential buildings are surrounded by high fences to maintain indoor privacy (Al-Jawadi & Noori, 2001; Kareem, 2009). In multi-family buildings, one of the main issues that have negatively affected the satisfaction of residents is the lack of privacy (A. R. Mahmood, 2012; T. S. Mahmood, 2011).

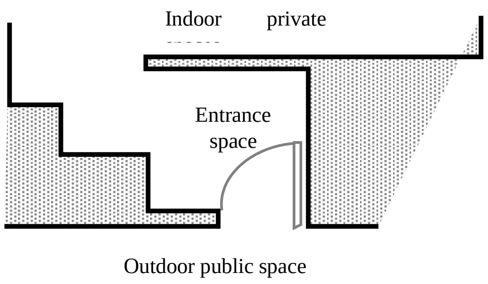


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Figure 2. 6. Traditional strategies to provide privacy
Source: the researcher; (Facebook, 2015)

Regarding the aesthetical aspect, typically, this has been related to the external design of the building. Studies state that Iraqis are considerate of having their residential buildings in distinctive forms as an approach to express themselves (Figure 2.7) (Yusif, Abd-alameer, & Nihad 2010). Studies show that the outdoor forms of residential buildings have been changing throughout time according to changes in social tastes and architectural styles since the beginning of the previous century (S. A. Ali, 2009; Maan, Said, & Idrees, 2013).

Figure 2. 7. Examples of bespoke external designs of modern housing units

D. Financial requirements

The economic conditions of communities and individuals play a vital role in determining their residential choices (Abod et al., 2011). In Iraq, the context of the inefficient financial system, the high housing construction costs and the widespread poverty in the country has made affordability one of the housing concerns of Iraqis (Nagy, 2006; PADCO, 2006; The Higher Committee for Poverty Reduction Policies, 2009). As an indicator of the level of housing unaffordability in the country, recent statistical reports by the Iraqi Central Statistical Organization (ICSO) state that the current average annual income of households in the country is around ID 9500000 and ID 4000000 for governmental employees and self-employed people, respectively. In a typical economic scenario, the minimum cost of an economic housing unit in multifamily housing developments constructed by the government is around ID 60000000 (S. A.-D. H. Ali & Al-Kindi, 2016). An economic single-family housing unit suggested by studies costs around ID 11000000 (Dietrich, Rashid, & Willkomm, 2014; S. R. Mohammed & Hamza, 2015). These figures mean that, in the best-case scenario, with the absence of an efficient supporting financial system, a governmental employee needs six years to be able to afford to purchase a housing unit, if the total income is saved for this purpose. In the worst-case economic scenario, self-employed people need 25 years of exclusively keeping their obtained income to afford to construct an economic single-family housing unit.

### 2.1.3. Housing challenges and requirements: summary

Two sets of housing requirements need to be considered in investigating the applicability of the courtyard pattern and its potential contributions towards the housing sector in Iraq. These two sets include the residential requirements of Iraqis and the current housing sector challenges (Table 2. 1). Missing any of these two sets of requirements might lead either to having inefficient designs for the current problematic housing conditions or unacceptable buildings by

Iraqis. Accordingly, courtyards need to be proposed and designed in new housing developments with considering all of these challenges and requirements.

Table 2. 1. Housing requirements in Iraq

| | | |
|---|---|---|
| Residential requirements of Iraqis | Spatial requirements | Providing sufficient & efficient spaces |
| | | Providing flexibility and adaptability |
| | Environmental comfort requirements | Considering temperature, humidity, ventilation, lighting and sound |
| | Economic requirements | Reducing the Initial costs |
| | | Reducing the running costs |
| | Social & Psychological requirements | Providing privacy |
| | | Providing outside aesthetic form |
| Housing sector challenges | Housing production requirements | Increasing housing production rate |
| | Land management requirements | Increasing land-use efficiency |
| | Economic requirements | Reducing the Initial costs |
| | Infrastructure requirements | Having efficient use of infrastructure services |
| | Construction materials requirements | Increasing materials use efficiency |

## 2.2. Housing policy and construction approaches in Iraq

Following defining housing challenges and requirements in Iraq, this research explored the adopted housing policy and construction practice in the country to address these challenges. This is the second step of the research work on exploring the applicability of the courtyard pattern within the Iraqi housing context. The research aimed for this exploration to establish the applicability of the courtyard pattern in Iraq and its possible contribution towards satisfying the housing requirements and challenges in the country.

### 2.2.1. Housing policy in Iraq

To define a solution approach for the housing challenges in the country, a new Iraqi National Housing Policy (INHP) was issued in 2010 and updated in 2017 by the Iraqi government in cooperation with the UN. The Policy proposed a solution which aimed, primarily, to increase the housing production and diminish the housing shortage. The proposed solution focuses on defining the roles of the public sector and the private sector. According to the proposed solution, the public sector should direct its efforts towards policy making and supervision, and providing help to disadvantaged social groups. The private sector should work as the main provider of housing units. Within this framework, the INHP suggests following a number of steps towards achieving its production strategy. It states that the public sector should improve and keep its housing production at a sufficient level until the private sector becomes gradually able to take the lead. Furthermore, it confirmed the importance of maintaining the current housing stock and upgrading those informal settlements that can be developed (Iraqi Ministry of Construction and Housing, 2010). This approach is different from what had been adopted in Iraq until issuing the new policy in 2010. Previously, the housing sector was considered as a service that should be provided by the state. The role of the private sector was limited to private dwellings constructed by individual owners with significant support from the state. The private sector had limited or no role in the construction of large-scale housing developments (Al-Hamawandi & Al-Qaisi, 2010; Nagy, 2006; PADCO, 2006).

This proposed solution approach by the INHP is highly accepted by housing studies in Iraq (Al-Kenani, Mutlak, & Ibrahim, 2014; Al-Masaudi & Al-Saadi, 2012; R. H. Ali & Fayadh, 2014; Hachim, Jazee, & Munshed, 2011). Furthermore, it agrees with what is suggested by international housing studies, such as (Okpala, 1992), (Keivani & Werna, 2001), (Bredenoord & van Lindert, 2010), (Buckley & Kalarickal, 2005), (Yap & De Wandeler, 2010), (Sengupta, 2010). However, an assessment of the housing sector progress after around nine years of issuing the INHP shows that the housing situation in the country has not changed and most of the problems remain (Iraqi-Ministry-of-Planning, 2013; Khalaf, 2015). The public sector has been developing large housing projects of multi-family buildings, but it is still far from satisfying the housing needs in the country. Between 2003 and 2011, only 2586 dwellings were completed, and 12664 dwellings were under construction (Abdulrazak & Mori, 2012). The private sector is weak. It has just started to evolve after decades of having the public sector dominating, nearly, all of the economic sectors in the country. Furthermore, it suffers from a context of continuous terrorism activities (Hatem & Al-Tmeemy, 2015), and a negative investment environment (A. H. Ali, 2017; Nadhmy & Maala, 2013).

As a result of the large quantitative needs and the failure in developing sufficient housing production, informal construction activities have been increasing in the country. In Baghdad, the number of informal settlements increased from 25 in 2003 to more than 200 in 2012 (Al-Othman, Al-Okili, & Othman, 2009). Currently, they spread in many Iraqi cities providing shelters for around 2.4 million people (Central-statistcs-organization, 2013). This situation is similar to the housing experience of many countries around the world, including some regional countries, such as Syria (Goulden, 2011), Morrocco (Bouchanine, 2003); and Egypt (El Kafrawy, 2012). In these countries and worldwide, the adopted approach in such scenarios has been to, temporarily, acknowledge the inevitable informal construction activities. The aim is to make informal settlements a positive addition to the housing stock and a part of the solution, rather than a problem (Bredenoord, Van Lindert, & Smets, 2014; Lara, Cervilla, & Castro, 2008; Nakamura, 2014; Sabnani, Latkar, & Sharma, 2014). This has not been adopted as a formal approach in the INHP; however, it considers upgrading and improving informal housing developments as a part of its solution approach.

This exploration suggests that, currently, there are two dominant housing provision approaches in Iraq aiming to solve its quantitative housing challenges: mass construction of multi-family buildings by the public and private sector and private informal construction activities (Refer to Appendix C. for further details). Courtyard buildings can be introduced through both of these two modes of housing provision.

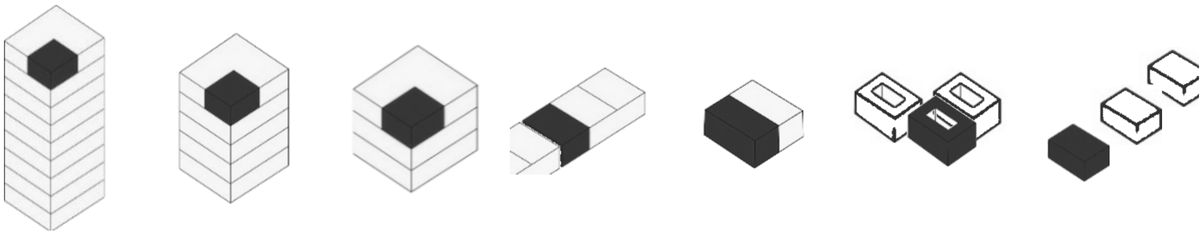
### 2.2.2. Construction practice & building patterns in Iraq

In Iraq, the adopted housing construction practice has included Bespoke housing, Self-help housing, and Mass housing (Figure 2. 8). For the period between the 1980s and the beginning of the 2000s, the first approach was responsible for producing around 60% of the total housing production. This approach, typically, requires large expenses that cannot be afforded by a large percentage of Iraqis. The Self-help housing, with various ranges of occupants' involvement in the construction, came in second place by producing around 30% of the total housing production. The mass-housing was the least used one; its share was only around 10% (Iraqi Ministry of Planning, 2010; PADCO, 2006). Currently, the situation is mostly the same. A limited share of the production is mass housing projects developed by the Iraqi government, to satisfy the housing needs, and some private investors. Bespoke housing is the dominant production approach (Iraqi Ministry of Construction and Housing, 2017). Self-help housing in urban areas is typically used in informal construction activities where buildings are poorly constructed (Hamza, 2015). It is not a planned construction approach supported and guided by the government, as what can be seen in other countries where this approach is formally adopted as a solution to support housing production (Dhabia, Mutlak, & Al-Kinany, 2014).

Bespoke single-family house | Mass construction of multi-family buildings | Informally self-built houses

Figure 2. 8. Adopted construction approaches in Iraq

Within this construction practice, the courtyard pattern is one of seven residential building patterns used in Iraq. The other building patterns include the single-family detached, semi-detached and row houses, and the multi-family low-rise, mid-rise and high-rise buildings (State Commission for Housing, 2010) (Figure 2. 9). There are no statistics about the specific use of each of these patterns. However, general construction statistics by the Iraqi Statistical Organization indicate that single-family housing is the dominant building form. The multi-family housing represents a limited share of the newly built housing units. In 2016, the total number of built single-family houses was 6800 houses, while the total number of constructed multi-family buildings was eleven (Central Statistical Organization, 2016). Within the single-family pattern, the row pattern has been the most used one due to urban land scarcity and economic constraints (Al-Sadkhan & A. K. & Alaa-eldein, 2013).



High-rise building (above 8 storeys) | Mid-rise building (4-8 storeys) | Low-rise building (3-4 storeys) | Row (terrace) house | Semi-detached house | Courtyard house | Detached house

Figure 2. 9. Residential building patterns in Iraq

This adoption of construction practices indicates that the mass construction of multi-family buildings, although limited, has been adopted by the public sector as a solution to satisfy the large quantitative housing needs. The self-help strategies have not been adopted by the government as a solution for the housing problem of the country.

## 2.3. Alignment of courtyard design with the housing context in Iraq

The exploration of the housing context in Iraq shows that there is a set of housing requirements and challenges in the country. The most crucial challenge is the large housing shortage and production shortfall. As a response, to diminish this quantitative challenge, Iraq has adopted a housing policy and a construction approach that includes having public and private mass construction of multi-family buildings. This research aimed to determine the opportunities to adopt the courtyard pattern within this adopted housing construction approach in the country to address its challenges and to capitalise on the potential thermal advantages of the courtyard pattern. For this purpose, the research conducted an intensive literature review and an online survey.

- The literature review explored the conducted research work by previous studies on assessing the efficiency of the seven building patterns in satisfying the housing requirements and challenges in Iraq (Section 2.1). Table 2. 2 shows the positive and negative impacts of the courtyard pattern and the other possible building patterns in satisfying each of the defined housing requirements and challenges. It can be seen that there are gaps in some of the efficiency aspects which are filled by the survey reported in the current study.
- The survey asked the public about their residential requirements and preferences. Moreover, the survey gathered expert opinions in the Iraqi housing sector about the efficiency of the seven building patterns in satisfying the housing requirements and challenges in the country. The survey for the public was prepared using Google Forms. Random groups on Facebook from different Iraqi cities were used to contact random potential participants. A link to the online survey was sent to those potential Iraqi respondents as messages through their Facebook accounts. This was found to be the most efficient way to contact people remotely. To gather opinions from the experts, an electronic survey form was sent to a selected number of Iraqi experts in the housing sector via emails. A total number of 410 people and 14 experts participated in the surveys (Refer to Appendix D for further details on the survey design and data collection).

The results of the survey and the literature review show that single-family patterns offer higher chances to satisfy the preferences of Iraqis than multi-family patterns. Survey outcomes indicate that single-family patterns are preferred by Iraqis to multi-family patterns. Yet, the multi-family patterns are more efficient in addressing the housing sector challenges (Figure 2. 10) (Table 2. 2). These results agree with other studies in the field. Single-family patterns are reported to offer higher potentiality to satisfy the individual needs of occupants, but at the cost of higher expenses (Shin, An, Cho, Kim, & Kang, 2008; Teige, 2002; Walliman, 2007). Multi-family housing is an economic solution, but it offers fewer opportunities to satisfy the individual requirements of occupants (Habraken, 1972; Teige, 2002; Urban, 2012). Although Iraqis appreciate its economic advantages, the design of multi-family buildings limits the opportunity to satisfy their requirements of having sufficient living area, privacy and abilities to make modifications in their dwellings (A. R. Mahmood, 2012; B. Shaheen, R. & S. Ahmad, L., 2011). These requirements, in addition to having a private open space for occupants, are the preferred features by Iraqis in the single-family patterns (Mutlak & Al-Zubaidi, 2017).

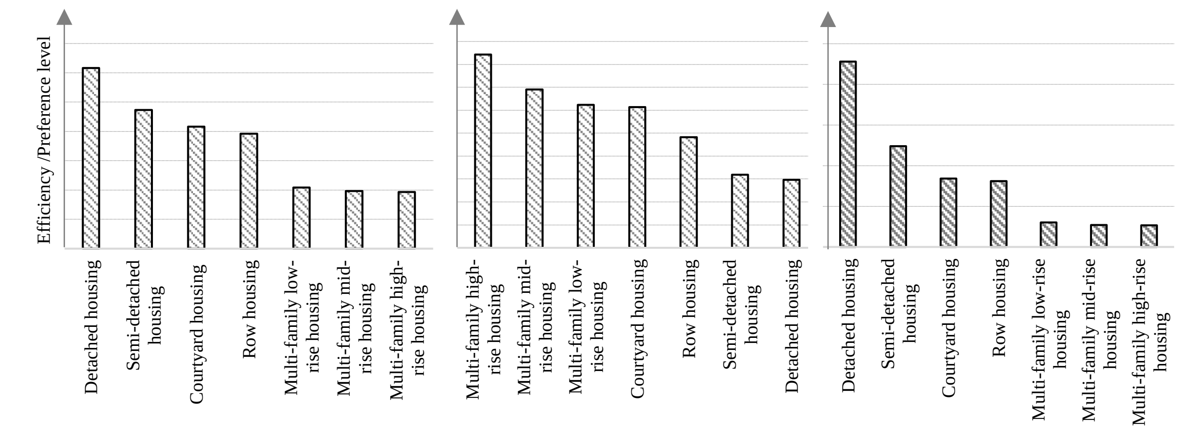
Table 2. 2. Assessment of building patterns' efficiency for Iraq -previous studies

| Evaluation criteria (Based on the explored housing requirements (Section 2.1)) | | | Building patterns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Single-family patterns | | | | Multi-family patterns | | |
| | The requirements fields | The required features | Detached | Semi-detached | Terrace (Raw) | Courtyard | Low-rise | Mid-rise | High-rise |
| Iraqis preferences | Internal layout requirements | Providing sufficient rooms | - | - | - | - | - | - | - |
| | | Providing the ability for modifications | - | - | - | 12,13, 14,15 | - | - | - |
| | Indoor environment requirements | Providing comfortable indoor environment | - | - | - | 13,16, 17,18, ,19,20 | - | - | - |
| | Psychological requirements | Having Beautiful outside form | - | - | - | 16 | - | - | - |
| | | Providing Privacy | 21 | 15 | 15 | 13, 14,15, 16,21 | - | - | - |
| | Economic requirements | Reducing the initial costs | - | - | - | 12 | 2,7,8, 13 | 8,13 | 8,13 |
| | | Reducing the running costs | - | - | - | 12,17 ,20 | - | - | - |
| Current housing requirements | Housing production efficiency | Having efficient housing production | - | - | - | - | 2, 10, 13 | 13 | 13 |
| | Land use efficiency | Increasing land use efficiency | 2 | 2 | 2 | 12 | 2,5,7, 8,13 | 8,13 | 8,13 |
| | Infrastructure use efficiency | Having efficient infrastructure services use | - | - | - | 13,17, 20 | - | - | - |
| | construction materials use efficiency | Increasing construction material use efficiency | - | - | - | - | - | - | - |
| | Housing affordability | Reducing the initial costs | - | - | - | - | 2,5,7, 8,13 | 8,13 | 8,13 |
| | | Reducing the running costs | - | - | - | 12,17, 19,21 | - | - | - |

| The key | Negative Impact<br>A housing pattern or construction approach is negatively affecting satisfying a housing requirement. | Positive impact<br>A housing pattern or construction approach is positively affecting satisfying a housing requirement. | - Undetermined impact<br>The impact of housing patterns and construction approaches on satisfying requirements has not been investigated by studies. |
|---|---|---|---|

The numbers in the boxes refer to the reference number which can be found below as sources.

Source: (Mohee, 2011)(1); (Al-Hussaini, 2015)(2); (Abbood, Al-Obaidi, & H., 2015) (3); (Afif, 2013) (4); (Al-Korayshi, 2006) (5); (Al-Khafaji, 2016) (6); (Mula-Huish & Jumaa, 2008)(7); (Ibrahem, 2012) (8); (Al-Kenani et al., 2014)(9); (T. S. Mahmood, 2011) (10); (Abdul-Kader, 2012)(12); (A. H. Al-Jameel & Al-Hafith, 2012)(13); (Mustafa & Hassan, 2010) (14); (Al-Thahab et al., 2014)(15); (B. Shaheen, R. & S. Ahmad, L., , 2011)(16); (Al-Jawadi, 2011)(17); (M. I. Mohammed, 2010)(18); (Agha, 2015)(19); (Kareem, 2009)(20);(W. S. Mahmood & Yosif, 2004) (21).




Efficiency of building patterns in satisfying Iraqis' preferences. | Efficiency of building patterns in addressing housing sector challenges. | Preferences of Iraqis regarding residential building patterns.

Figure 2. 10. Building patterns' efficiency for Iraqis and housing sector
(Refer to appendix D for further details)

Regarding the courtyard pattern, results suggest that it cannot be adopted in Iraq to solve all housing problems. Previous studies and the experts surveyed in this study both suggest that the courtyard pattern is less efficient than the multi-family building patterns in addressing the large quantitative challenges in the country. However, results indicate that it can be of positive contribution if it is incorporated within multi-family buildings. The courtyard pattern comes as the third preferred housing pattern for Iraqis after the detached and semi-detached patterns. In comparison to other single-family patterns, it was assessed to be the most efficient pattern in addressing the housing challenges in the country alongside its efficiency in satisfying the requirements of privacy and thermal efficiency for Iraqis (Figure 2. 10) (Table 2. 2). The possible advantages of incorporating courtyard spaces within multi-family buildings include:

- Having a more thermally comfortable built environment and less energy consumption and, as a result, lower running costs (Abdul-Kader, 2012; M. I. Mohammed, 2010).
- Providing flexible indoor layout as courtyard spaces offer similar opportunities to all surrounding spaces to be used for different functions, which is one of the main principles of flexible buildings (A. H. Al-Jameel & Al-Hafith, 2012).
- Offering a private outdoor space to occupants (W. S. Mahmood & Yosif, 2004; B. Shaheen, R. & S. Ahmad, L., 2011).
- Allowing efficient land use due to the fact that courtyards enable a compact urban fabric and, as a result, more efficient use of urban lands (Abdul-Kader, 2012).

In conclusion, these results show that the practice of constructing multi-family buildings is efficient in addressing the housing challenges, but not the preferences of Iraqis. Incorporating courtyards within multi-family buildings may help to overcome some disadvantages in multi-family buildings and to develop efficient and responsive housing developments (Figure 2. 11). Incorporating courtyards within flats in multi-family buildings may provide several positive features. This may include having more thermally and energy-efficient buildings, high privacy levels and an open private open space for occupants. These features are among the main aspects that concern Iraqis in their residential environments. Having multi-family buildings adopted as the prime pattern will enable addressing the housing challenges. By introducing the courtyard and improving the performance and qualities of multi-family buildings, Iraqis may have a higher level of acceptability for multi-family building patterns.

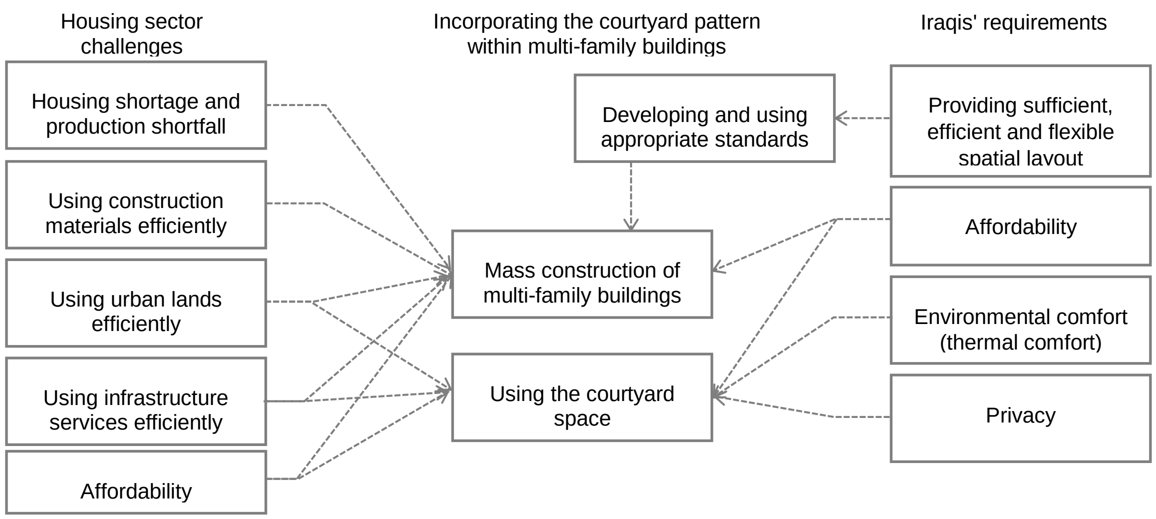



Figure 2. 11. Integrating courtyards within multi-family buildings for Iraq

Based on the conducted literature review and survey
(Refer to Appendix D for further details)

## 2.4. Summary of chapter two

This chapter explored the housing context in Iraq and establihsed the opportunities for using courtyards in the country. The chapter argues that there is a large quantitative housing problem in the country which needs to be considered when proposing any solution, including suggesting using courtyards. It describes a set of housing requirements for Iraqis that needs to be considered to develop solutions that satisfy the local population. The adopted construction practice in the country includes using multi-family buildings as the primary solution approach to address the quantitative challenges. Within this context, the exploration shows that the courtyard pattern, on its own, is not the most efficient pattern to address the quantitative housing challenges in the country, but the multi-family buildings. However, the courtyard pattern, if incorporated within multi-family buildings, can help to satisfy a number of Iraqis' requirements which are not offered by the multi-family buildings, including thermal comfort, privacy and having a private open space in housing units. Accordingly, this research suggests that courtyards need to be considered as an important solution within multi-family buildings.

# Chapter 3 ….. Courtyards and thermal comfort

# Chapter 3 - Courtyards and thermal comfort

Following the exploration of the context of using courtyards in Iraq, this chapter investigates the thermal efficiency of courtyards in the country, which is a core argument for using this building pattern in modern residential buildings. The study determined the level of thermal comfort courtyards can offer to occupants in Iraq. For this purpose, it investigated the thermal conditions of courtyards and determined the thermal comfort limits of Iraqis.

This chapter reviews previous literature on the subjects of thermal comfort and courtyards in Iraq. It explores previous studies and determines the factors and variables that need to be considered when examining thermal comfort in courtyards. The chapter is divided into two sections:

- The first section explores the subject of thermal comfort. It defines the notion of thermal comfort, its effective factors, measuring indices, and the thermal comfort threshold of Iraqis.
- The second section explores the thermal performance of courtyards. It explores the thermal performance of the courtyard building pattern in comparison to other building patterns, its environmental elements and principles and the extent of thermal comfort that it can offer to occupants. In this section, traditional courtyard architecture is explored and used as a reference for discussing the thermal performance of courtyards. The underlying argument is that traditional courtyard buildings offer realistic examples of how this building pattern performs.

## 3.1. Thermal comfort

Assessing the thermal efficiency of the courtyard pattern depends on the extent of thermal comfort it can offer to its occupants (Roaf, 1990). Accordingly, to assess the thermal efficiency of courtyards in Iraq, the thermal comfort limits of Iraqi people need to be determined.

First of all, thermal comfort is one of the factors that affect the overall comfort in built environments, which include, in addition to thermal comfort, air quality, acoustic and visual properties (Al horr et al., 2016; Frontczak & Wargocki, 2011; "ISHRAE," 2015). Thermal comfort affects the health and productivity of people (Fanger, 1970; Fergus Nicol et al., 2012). Moreover, thermal comfort is related to the energy consumption in buildings and resultant $CO^2$ emissions as a high percentage of consumed energy is used for air-conditioning purposes (Elaiab, 2014; Fergus Nicol et al., 2012; L. Yang, Yan, & Lam, 2014).

Thermal comfort has been defined from different perspectives: physiological, rational and psychological. As a physiological concept: it is defined as that sensation of heat or cold perceived by the relevant receptors in the human body embedded within the skin. From a rational perspective, it is the thermal balance between the heat flow from and to the human body (Enescu, 2017; Höppe, 2002). As a psychological concept, which is the definition that dominates international standards such as ASHRAE and ISO 7730, it is 'that condition of mind that expresses satisfaction with thermal environments' (ASHRAE, 2005; Enescu, 2017; Höppe, 2002). Thermal comfort is a subjective measure as it is different from one person to another, and for the same person from time to time and from one place to another (Elaiab, 2014). From these definitions, it can be concluded that thermal comfort is a subjective sensation that is affected by surrounding environmental features (Walls, Parker, & Walliss, 2015).

### 3.1.1. Thermal sensation effective factors

Since the beginning of the 20th century, intensive research work has been conducted through surveys and thermal comfort experiments with the aim to determine the effective factors that affect the thermal sensation of people. This work has identified two groups of factors that affect and govern thermal sensation: quantitative and qualitative factors (Ghani et al., 2016; Reiter & De Herde, 2003).

A. <u>Quantitative factors</u>

This group includes six measurable factors, which have been defined through doing a large number of thermal comfort surveys and experiments. They include air temperature; air velocity; humidity; Mean Radiant Temperature (MRT); people activity level and clothing level (Fanger, 1970; Nikolopoulou, 2011; Reiter & De Herde, 2003). The first four factors are environmental factors, while the other two are behavioural factors (Abdel-Ghany, Al-Helal, & Shady, 2013; Aljawabra, 2014):

- Air temperature (Ta): this factor has a high impact on thermal comfort (CIBSE, 2016). The value of air temperature affects the thermal sensation of people because of the heat exchange between the body and the surrounding air through the skin or clothes (Fergus Nicol et al., 2012).
- Mean Radiant Temperature (MRT): this factor is related to the temperature of surfaces surrounding the human body. It affects the thermal sensation of people as they exchange thermal radiation with surrounding surfaces. Its value is affected by the posture and location of the human body in relation to surrounding surfaces (Bobenhausen, 1994; CIBSE, 2016).
- Air velocity: This factor impacts the thermal sensation of people in two ways: first, it affects the air change rate around the body, which affects the heat exchange between the human body and the surrounding air layer. Second, it affects sweat evaporation from the skin, which has a cooling impact on the human body (CIBSE, 2016; Fergus Nicol et al., 2012; Santamouris & Asimakopoulos, 1996).
- Humidity: this factor relates to the vapour pressure or the percentage of water mass in a unit of dry air (CIBSE, 2016; Fanger, 1970). This variable is not sensed by people as temperature as there are no humidity sensors in the human body. However, in a hot environment with a high level of water moisture in the air, the high humidity inhibits sweat evaporation from the skin, which reduces the efficiency of this mechanism of the human body to decrease the inside temperature (CIBSE, 2016; Santamouris & Asimakopoulos, 1996).
- Activity level: the thermal sensation of people is related to their activities, such as sitting, eating, relaxing or running. Each activity leads to a different level of metabolic heat production, which affects the thermal sensation (CIBSE, 2016; Fanger, 1970). Met is the unit value that is used to express the activity level of the human body numerically (ASHRAE, 2005; CIBSE, 2016).
- Clothing: clothing ensembles of different thicknesses and porosity affect the thermal sensation of people by affecting the thermal conductivity between the body and the surrounding environment (Fanger, 1970, pp. 30-31; Fergus Nicol et al., 2012). Because it is difficult to measure the insulation of clothes in the routine engineering work, the

‘clo value’ has been introduced and developed to determine and describe the thermal conductivity of different clothing ensembles (Fanger, 1970; Fergus Nicol et al., 2012).

B. <u>Qualitative factors</u>

In addition to the previous six measurable factors that affect the thermal sensation of people, studies suggest qualitative factors of significant impact on thermal sensation (Reiter & De Herde, 2003):

- Perception of potential control: people tend to be more tolerant with microclimatic conditions when they feel that they have a range of control over their environments. This may include, for instance, the ability of opening windows, using a fan or changing their positions (Aljawabra, 2014; Reiter & De Herde, 2003; Nikolopoulou, 2011).
- Time of exposure: people tend to be more tolerant with thermal conditions if they know that their exposure to uncomfortable conditions is for a short time only (Aljawabra, 2014; Nikolopoulou, Baker, & Steemers, 2001).
- Diversity of microclimate environments: studies have found that people have a higher level of thermal comfort in outdoor spaces where there are shaded places, sunny places and water elements comparing to spaces without this kind of diversity (Aljawabra, 2014; Reiter & De Herde, 2003).
- Previous experience & continuity of climatic conditions: it has been found that the thermal sensation of people is affected by their expectation and past experiences (Aljawabra, 2014; Ghani et al., 2016; Nikolopoulou, 2011; Reiter & De Herde, 2003). They might feel comfortable in a low-temperature situation if they have expected that through their previous experiences. The reason is that people will be prepared physiologically and psychologically to accept such climatic conditions (Reiter & De Herde, 2003).
- Cultural and social background: the social and cultural background of people affects their activity types, clothes and space usage, which have a significant impact on their thermal comfort limits (Aljawabra & Nikolopoulou, 2009).
- Psychological factors: studies have found that the thermal sensation of people may change by changing the carpet or the sofa of a space, even whilst the temperature remains constant (Höppe, 2002).

From exploring these interrelated factors, it can be seen that determining the thermal sensation of people and defining specific thermal comfort limits is not an easy task. However, because of its importance for the wellbeing, health and productivity of people, there have been intensive efforts to develop models to predict thermal sensation and thermal comfort limits of people.

### 3.1.2. Predicting and determining people thermal sensation

The interest in determining the thermal sensation of people started at the beginning of the 20th century driven by two triggers. The first trigger was related to developments in air-conditioning systems and the interest in providing a comfortable indoor environment (Fabbri, 2015; J Fergus Nicol & Roaf, 2017). The second trigger was related to military purposes, which required a better understanding of the conditions of high temperatures in ships and airplanes where people work (Fabbri, 2015). Since that time, much work has been done to develop approaches to determine and predict the thermal sensation of people. Currently, there are two widely used models for this purpose: the static model and the adaptive model (Richard J. de Dear & Gail

S. Brager, 2002; Yao, Li, & Liu, 2009). Both of these two models consider the impact of a range of the thermal comfort factors discussed in the previous section:

- The static model (or the heat balance model): this model was proposed by Fanger in the 1970s to determine static and universal thermal comfort limits. This model was developed through thermal comfort surveys, which included studying the thermal sensation of a large number of people under various assigned environmental conditions in special experimental chambers (de Dear & Brager, 1998; Richard J. de Dear & Gail S. Brager, 2002; Fanger, 1970; Yao et al., 2009). The underlying premise of the static model is the assumption that the thermal sensation of people is governed by the thermal balance between the human body and the surrounding environment (Nikolopoulou et al., 2001; Reiter & De Herde, 2003). Within this framework, the model employs the six quantitative factors in the prediction of the thermal sensation of people (Fabbri, 2015; Fergus Nicol et al., 2012). This model is called the steady-state model because it does not consider the dynamic human adaptation and responses to surrounding climatic conditions (Chen & Ng, 2012).
- The adaptive model: this thermal comfort model was proposed by researchers, including Humphreys, Nicole and de Dear at the end of the 20th century. It is built on the idea that, contrary to the static model, it is not possible to define universal thermal comfort limits. The model suggests that there are dynamic factors other than the factors of the human body thermal balance that need to be taken into account. It argues that people from different places and regions are different in their thermal sensations due to factors such as their previous experiences and expectations. It proposes that people can adapt themselves by time to their climatic conditions (de Dear & Brager, 1998; Richard J. de Dear & Gail S. Brager, 2002; Fergus Nicol, 2004; J.F. Nicol & Humphreys, 2002). This model has been developed by conducting thermal comfort surveys to assess the thermal sensation of people in their actual built environments doing their regular activities. This approach has been found to give more accurate results than surveys in climatic chambers (Fergus Nicol et al., 2012). To determine comfort limits, the adaptive model correlates the thermal sensation of people with outdoor thermal conditions. It employs statistical analysis to develop a regression model that defines the thermal comfort limits for a range of outdoor temperatures (MA Humphreys, Rijal, & Nicol, 2010; Manu, Shukla, Rawal, Thomas, & de Dear, 2016; Toe & Kubota, 2013). The central argument for adopting this approach is that the adaption options, activities, or clothing of people are primarily affected by the outdoor thermal conditions (Halawa & Van Hoof, 2012; Fergus Nicol et al., 2012).

### 3.1.3. Comparison between the adaptive and the static models

Both of the two thermal comfort models have been used to develop local and international thermal comfort standards (Brager & de Dear, 2001; Fergus Nicol et al., 2012). However, their different approaches to determining thermal sensation may yield different results. As with any model, it is important to consider the assumptions of the thermal comfort models when applying them in a specific context. In the case of outdoor and naturally ventilated spaces, studies have found that the static model tends to overestimate thermal discomfort. In this case, the adaptive model, typically, gives closer predictions to the actual thermal sensation of people. The reason behind this is that, in this kind of spaces, microclimatic conditions change widely throughout the day while the static model requires static conditions to establish the thermal balance status (Brager & de Dear, 2001; Fergus Nicol et al., 2012). In controlled indoor spaces, the static model gives better predictions than it does for outdoor spaces. However, studies have found that the static model does not give accurate predictions if it is used for contexts of different conditions than the places where its equations have been developed. Studies have identified three common causes of deviations in the predictions of the static model:

- Social and cultural factors: the static model only considers the impact of the quantitative factors on thermal comfort, which is not the case in the adaptive model (Richard J De Dear & Gail S Brager, 2002; Fabbri, 2015; Fergus Nicol et al., 2012). The static model is not intended to consider the social and cultural factors that affect the thermal sensation of people (Richard J De Dear & Gail S Brager, 2002; Fergus Nicol et al., 2012).
- Formulation and measurement errors: Some errors result from the underlying approach where the static model requires some values which are difficult to be measured accurately, such as the clothing level and metabolic rate (Fergus Nicol et al., 2012).
- Thermal chamber results: there is a methodological question about the applicability of results collected in special chambers to actual living/working environments. Studies have found that people accept a wider range of microclimatic conditions in their actual environments than what has been determined in the experimental chamber. In actual life, people can adapt themselves through behavioural activities such as changing their clothing, posture or opening a window to feel thermally comfortable, which they cannot do during an experiment in a climatic chamber (Fergus Nicol et al., 2012; L. Yang et al., 2014)

Based on this review, it can be concluded that the adaptive model considers more factors and can be applied to a wider range of environments than the static model (Figure 3. 1). Accordingly, it is more appropriate for the purpose of this research, which is to investigate thermal comfort in courtyards, for two reasons. First, it is more suitable to predict the thermal sensation of people in dynamic microclimatic conditions, which is the case of the courtyard space. Second, the adaptive model is better in considering the local climatic, social and cultural factors in Iraq.

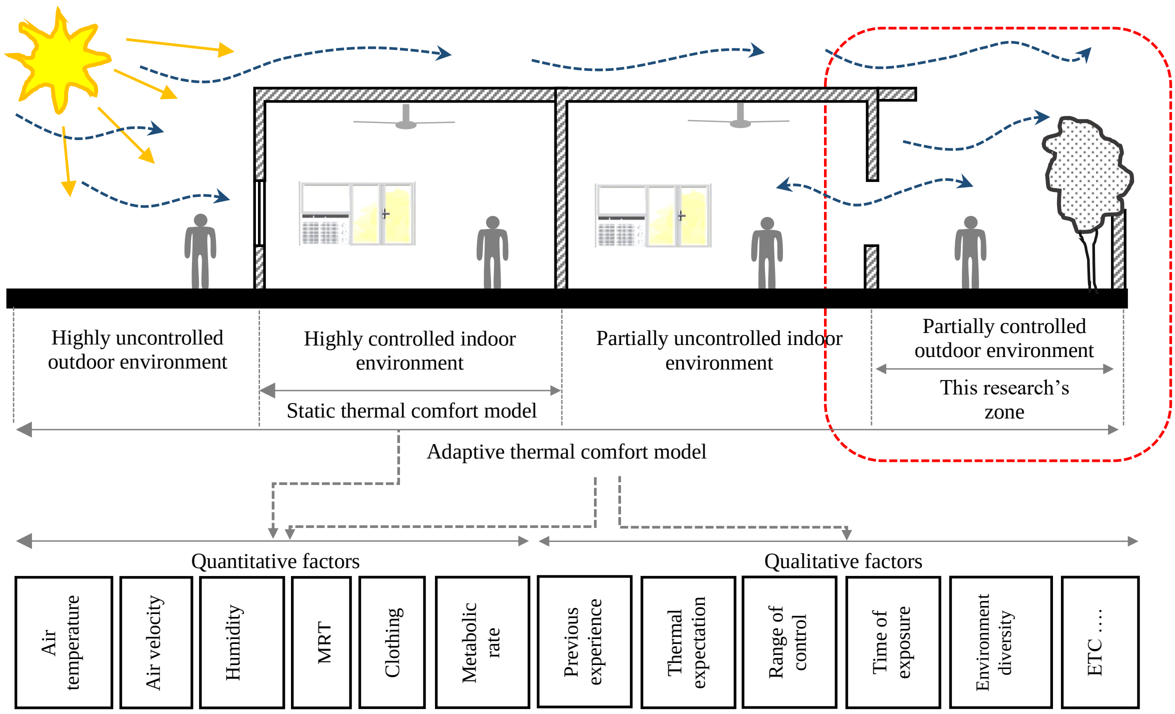



Figure 3. 1. Comparison between the adaptive and static comfort models

### 3.1.4. Thermal comfort indices

To quantify the thermal sensation of people in the static or adaptive models, an index is needed that combines the effects of all of the relevant factors in one value that reflects the actual thermal sensation of human beings. Various studies have been conducted in this area since 1905 (Epstein & Moran, 2006; Fabbri, 2015; Hall, 2010; de Wilde, 2018). Together they have proposed more than 100 thermal indices for various climates and countries (Nikolopoulou, 2011; Walls et al., 2015). Developed thermal indices can be classified into three categories: rational indices, empirical indices and direct indices (Epstein & Moran, 2006; Morabito et al., 2014; Wilson & Sharples, 2015).

Rational indices have been developed, in most cases, for indoor spaces where the majority of climatic conditions can be controlled and determined. They depend on determining the interaction of the human body with a specific set of measurable and controllable thermal conditions. Empirical indices have been developed through detailed monitoring of people behaviour and thermal sensation in different case studies (Johansson, Thorsson, Emmanuel, & Krüger, 2014; Malekzadeh, 2009; Walls et al., 2015). Both of these categories have been developed depending on the static model, which makes their results inapplicable in dynamic environments such as external spaces or naturally ventilated indoor spaces (Walls et al., 2015). Among the widely used indices of this kind are the Predicted Mean Vote index (PMV) (Honjo, 2009; Nikolopoulou, 2011; Walls et al., 2015), the Standard Effective Temperature (SET), the Physiological Equivalent Temperature (PET) (Blazejczyk, Epstein, Jendritzky, Staiger, & Tinz, 2012; Honjo, 2009) and the Universal Thermal Climate Index (UTCI) (Abdel-Ghany et al., 2013).

Direct indices are used in the adaptive model. They depend on having direct measurements of environmental variables such as the air temperature, air velocity, radiation and humidity (Epstein & Moran, 2006; Wilson & Sharples, 2015). The direct indices used in previous studies include either direct measurements of a single factor, such as the air temperature, or combine a number of direct measurements such as the Wet Bulb Globe Temperature (WBGT), Globe temperature ($T_g$), and Operative temperature ($T_o$) (Blazejczyk et al., 2012; Bradshaw, 2010; Song, 2011). WBGT is a heat stress index, and it includes the impact of air temperature and solar radiation (Epstein & Moran, 2006). Globe temperature measures the combined effect of air temperature, air movement and radiation. The Operative temperature measures the combined effect of air temperature and the Mean Radiant Temperature (Song, 2011). The indices most used in thermal comfort studies are the Operative temperature and the Globe temperature as they have shown an acceptable correlation with people's thermal sensation (Michael Humphreys, Nicol, & Roaf, 2015; Rijal, Humphreys, & Nicol, 2017; Toe & Kubota, 2011). Direct indices that focus on one single factor might not give accurate predictions of people' thermal sensation because they do not combine the impact of the wider range of effective factors (Bradshaw, 2010). WGBT has been used to determine heat stress risk of people in workplaces in hot environments. WGBT is not normally used to determine and predict the thermal sensation of people Ghalhari, Dehghan, Shakeri, Abbasinia, & Asghari, 2019; Chowdhury, Hamada, & Ahmed, 2017; Epstein & Moran, 2006).

According to this exploration of possible thermal indices, this research adopts the Globe temperature to assess and predict the thermal sensation of Iraqis in a courtyard space. This adoption is based on the following three arguments. First, the Globe temperature is an adaptive model thermal comfort index. Second, it is of inclusive measurements as it combines the impact of air temperature, MRT and air velocity. Third, both the Operative temperature and the WBGT do not serve the purpose of this study. In studies where the Operative temperature is used, studies assumed that the air is still, which cannot be applied to the courtyard space as it is a semi-external space (MA Humphreys et al., 2010). WBGT is a heat stress index, and is not for assessing thermal comfort (Epstein & Moran, 2006).

### 3.1.5. Defining thermal comfort limits for Iraqis: knowledge gap (I)

This research needs to investigate the thermal comfort limits of Iraqis to assess the thermal efficiency of courtyards in this specific country. To do this, an adaptive thermal comfort model applicable for residential environments in Iraq is needed to in order to determine the extent of thermal comfort courtyards may offer to occupants. Determining the thermal comfort limits of Iraqis can be done through three approaches:

- The first approach is through applying an Iraqi or an equivalent international thermal comfort standard.
- The second approach is to use an adaptive thermal comfort model developed by previous studies for Iraq or another country of similar climate and culture. Climate and culture are stressed by this research in selecting an appropriate comfort standard because they both affect the thermal sensation and comfort limits of people.
- The third approach is to conduct a thermal comfort study in Iraq to develop an adaptive model for the country. This approach is to be adopted if the first two approaches fail to provide the required adaptive model.

First of all, there has been no dedicated thermal comfort standard or adaptive thermal comfort model developed for Iraq. Regarding possibly appropriate international standards, today, there are three thermal comfort standards which have been under continuous revisions and updating: ISO Standard 7730, ASHRAE Standard 55 and CEN Standard EN 15251 (M Humphreys, Nicol, Roaf, & Sykes, 2015; Fergus Nicol et al., 2012). These three international standards have been successfully used in the countries where they have been developed, and are also applied in countries where there are no local comfort standards. However, studies have been reporting errors from considering these standards in some places. The reason is that they are all developed based on empirical studies, typically, in moderate climate regions in the USA and Europe. The mean running outdoor temperature range that is included in these standards is 10ºC to 33ºC, which might be different from other regions, such as the hot climate ones (Farghal & Wagner, 2010). In Iraq, which is the case study of this research, the running mean outdoor temperature during 2018 and 2019 ranged between 8ºC and 38ºC (Iraqi meteorological organization; www.accurateweather.com). Therefore, it has been shown by some studies that, in hot-arid and hot-humid climates, people report thermal comfort temperature higher than the comfort limits defined by these standards (Fergus Nicol et al., 2012). Examples of such results are for instance studies from Cameron (Rupp, Vásquez, & Lamberts, 2015), Egypt (Farghal & Wagner, 2010), Libya (Eltrapolsi, 2016), and India (Indraganti, Ooka, Rijal, & Brager, 2014). Because of that, countries like Japan, China and Malaysia have developed local standards to meet their local conditions and requirements (Fergus Nicol et al., 2012). Accordingly, it can be concluded that these standards cannot be used to accurately determine the thermal comfort limits of Iraqis.

Exploring previous thermal comfort studies in Iraq or countries of similar climate and culture shows that there have been two comfort studies in Iraq and a number of studies in equivalent hot climate regions (Table 3. 1). Regarding the Iraqi studies, the first one was conducted in 1964 by Webb in houses in Baghdad. It collected 1284 thermal comfort votes in summer from 9 people. The study concluded that the comfort globe temperature, in summer in Iraq, is 32°C. The second study is Rashid et al (2018) who conducted a thermal comfort survey in classrooms for three months representing summer and winter. A total number of 164 people participated in the thermal comfort survey. Rashid et al 2018 found that the comfortable air temperature is 19°C in winter, and 29°C in summer. Although both of these two studies give useful indications about thermal comfort preferences in Baghdad, they do not provide information that can be extrapolated towards an adaptive comfort model for residential buildings in the country. They were conducted for a specific time of the year and only for Baghdad. Apart from that, Webb study is more than 50 years old now and included only nine participants. This may make it unreliable for the current time. Rashid et al study is recent, but, it cannot be used to define comfort limits in residential buildings as the comfort survey was conducted in classrooms, in which the adaptive opportunities for people are not the same as at homes.

Apart from the Iraqi studies, there is a number of studies that have been conducted in countries of similar climate and culture to Iraq, including Middle Eastern and North African countries. Table 3. 1 lists seven thermal comfort studies found in previous literature apart from the two Iraqi studies. These studies explored and determined the thermal comfort limits of people in indoor and outdoor spaces in Egypt, Qatar, Iran, Saudi Arabia and Morocco. Work included collecting thermal comfort votes and taking thermal measurements in offices, classrooms, residential buildings and urban spaces during different times of the year. The results of these studies give useful insights into thermal comfort limits of occupants in each of the investigated building typologies and spaces. However, none of these studies can be used as a reference to determine the thermal comfort limits of Iraqis for one or more of the following four reasons:

- They did not develop an adaptive thermal comfort model.
- Most of the work is from non-residential buildings, which makes their results not applicable to homes.
- Most reports are based on either small sample size or of a limited time frame. Although it is not a standard threshold, a representative sample size as recommended by (Nicol, Humphreys et al. 2012) is twenty participants giving around 2000 thermal comfort votes.
- The climatic conditions of their context are not similar to the climate of Iraq.

Based on this literature review, a knowledge gap was defined in this field: there is no adaptive thermal comfort model suitable for residential environments in Iraq that can be used to assess the thermal efficiency of courtyards. Accordingly, this research worked on developing an adaptive thermal comfort model for residential buildings in Iraq.

Table 3. 1. Previous studies - thermal comfort in countries of similar climate and culture to Iraq

| No | The study | Context | | | | Methodology | | | Results | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Country | Outdoor temperature range | Space context | Ventilation mode | Time frame | No. of participants | No. of votes | Thermal comfort limits | | Develop an adaptive comfort model |
| | | | | | | | | | Winter | Summer | |
| 01 | Webb, 1964 | Baghdad, Iraq | 0-52 | Houses | AC & NV | June & July | 9 | 1284 | --- | 32 | No |
| 02 | Rashid, Kornadt, & Voelker, 2018 | | | University | AC & NV | Dec, Jan & Aug. | 164 | 530 | 19 | 29 | Yes |
| 03 | Farghal & Wagner, 2010 | Cairo, Egypt | 10-35 | School | NV | Feb. – Dec. | 2584 | 2689 | 17 | 35 | Yes |
| 04 | Alshaikh, 2016 | Dammam, KSA | 5-40 | Houses | AC, NV, MM | Jan. , Aug. | 39 | 561 | 18-29 | 22.7-29.7 | Yes |
| 05 | Indraganti & Boussaa, 2018 | Doha, Qatar | 18-37 | Offices | AC | Thirteen months | 1174 | 3742 | 24 - 25 | | Yes |
| 06 | Heidari & Sharples, 2002 | Ilam, Iran | 1-53 | Offices | NV | One year | 30 | 3819 | 21.7 | 26.7 | Yes |
| | | | | Houses | | Aug. & Dec. | 891 | | 20.8 | 28.4 | |
| 07 | Heidari, 2008 | Tehran, Iran | -2 - 37 | Office | AC | July | --- | 631 | --- | 24.6 | No |
| | | | | | NV | | | | --- | 26.2 | |
| 08 | Amindeldar, Heidari, & Khalili, 2017 | | | Streets | ---- | January | 410 | | 14.2 | --- | No |
| 09 | Aljawabra, 2014 | Marrakech, Morocco | 5-35 | Streets | ---- | Feb, July, &Aug | 303 | | 14 | 36 | No |

AC: Air-conditioned spaces, NV: Naturally Ventilated spaces, MM: Mixed Mode ventilation mode

## 3.2. Courtyard pattern

By definition, the courtyard pattern consists of a building with an internal open space in its core, which provides access and natural lighting and ventilation to surrounding indoor spaces (Al-Hafith, Satish, Bradbury, & de Wilde, 2017; Soflaei et al., 2017). It can be found in the architecture of hot climate regions since the civilizations in Mesopotamia, Egypt, India and China (Khan & Majeed, 2015; Sthapak & Bandyopadhyay, 2014). In Iraq, as in other regional countries, it had been used for centuries, until the beginning of the 20th century, for climatic and social advantages (Edwards, 2006). However, since the collapse of the Ottoman Empire after WWI, the courtyard pattern has been replaced with modern building patterns, such as the detached and semi-detached buildings. This was due to social and political changes and the emergence of new international architectural styles and construction technologies (Ali Haider Al-Jameel & Haj-Kasim, 2012; Foruzanmehr, 2015). House styles have changed from the courtyard pattern with a limited opening to the outside within compact urban fabric to the current outward-oriented modern forms within wide grid-iron roads (Figure 3. 2) (S. A. Ali, 2009). However, due to its social, cultural and climatic advantages, studies, since the 1970s, have been testing and advocating re-introducing the courtyard pattern to the current and future architectural practice (Ali Haider Al-Jameel & Haj-Kasim, 2012; Al Jawadi, 2011; H. Ali, Turki & R. Shaheen, Bahjat, 2013).

Figure 3. 2. Traditional courtyard (left) and modern grid-iron built environments (right) in Mosul

Focusing on its climatic performance, the thermal performance of the courtyard pattern has been investigated in the previous four decades (Al-Azzawi, 1984; Al Jawadi, 2011; Edwards, 2006). Table 3. 2 lists ten studies presenting the range of exploration done for the thermal performance of courtyards, which included exploring the cases of thermally efficient courtyards and thermally inefficient ones. The work of these studies included conducting thermal studies and surveys in courtyard buildings and simulation experiments. Salman, 2016; Cho & Mohammadzadeh 2013; Al Jawadi, 2011, Manioğlu & Yılmaz; 2008 and Edwards, 2006 presented experiments and surveys showing that the courtyard, through passive strategies, can help to reduce the temperature inside buildings in comparison to outside by around 5.0 to 13.0 °C. This thermal performance of courtyard buildings may not be achievable in non-courtyard buildings. However, El-deep, El-Zafarany, & Sheriff, 2012 , El-Deeb 2014, Ratti, Raydan, & Steemers, 2003 and Roaf, 1990 demonstrated that the courtyard pattern can also be inefficient if it is not designed in correspondence with the climatic conditions and requirements of the surrounding environment. For instance, adopting the courtyard pattern in detached buildings does not help to achieve thermally efficient buildings as this implies having a larger surface area exposed to solar radiation and outdoor conditions (El-Deeb 2014; El-Deep, El-Zafarany & Sheriff, 2012).

Table 3. 2. Previous studies - climatic performance of the courtyard pattern

| Study | Study details | Results |
|---|---|---|
| Salman, 2016 | Investigated the thermal performance and thermal sensation of occupants of four courtyard and non-courtyard houses in Baghdad. The study depended on doing field measurements and interviews | Courtyard houses offer a more thermally comfortable environment to people. Occupants of the explored houses experience a higher level of thermal comfort in courtyard houses than in non-courtyard houses. |
| El-deep, El-Zafarany, & Sheriff, 2012<br><br>El-Deeb 2014 | Investigated the impact of building form on the thermal and energy performance of air-conditioned buildings in the desert environment. Using EnergyPlus simulation software, it compared the energy performance of the courtyard pattern form with rectangular, U-shape and H-shape forms. The compared forms were of the same area. | In case of being standalone air-conditioned buildings, courtyard buildings are the worst-case comparing to the other tested building forms. The reason is that courtyard buildings have a larger surface area, which means higher heat gain and loss. The study stresses the point that courtyard buildings need to be assessed as air-conditioned ones as most buildings now are air-conditioned. |
| Cho & Mohammadzadeh, 2013 | Conducted a simulation experiment using EnergyPlus simulation software. It measured the impact of natural ventilation in various zones of a courtyard house in Iran. | Having efficient natural ventilation in a courtyard house can lead to having up to 5.4 ºC temperature difference between inside and outside. |
| Al Jawadi, 2011 | Measured the temperature in a modern courtyard house in Baghdad | The air temperature in the courtyard and surrounding rooms was, respectively, 6.7ºC and 9.9 ºC less than the outdoor air temperature. |
| G. Manioğlu & Yılmaz, 2008 | Measured the temperature in courtyard and non-courtyard buildings, and conducted a survey in 100 modern and traditional courtyard houses | The temperature in the courtyard building is 5°C less than the non-courtyard house. 64% of the courtyard houses' occupants said that their houses are cool during summer, while 69% of the non-courtyard houses' occupants mentioned that their houses are hot. |
| Al-Zubaidi & Shaheen, 2008 | Compared two courtyard houses. One of them is of an open courtyard. The other one is of a closed courtyard. | The air temperature in the open courtyard is around 8 ºC less than the air temperature in the closed one. |
| Edwards, 2006 | Measured the temperature in a courtyard space and surrounding rooms in a courtyard house in Saudi Arabia. | Results showed that the temperature difference between outside and inside in courtyards is of up to 13ºC. |
| Ratti, Raydan, & Steemers, 2003 | Conducted simulation experiments to compare the climatic conditions in a courtyard building and two non-courtyard rectangular buildings. All of the examined buildings were of the same site coverage and height. | The results show that the courtyard form is more climatically efficient. However, it is not always the case. If the courtyard design does not take into consideration the impact of its climatic and urban contexts on its thermal conditions, the courtyard may be less efficient than other possible building forms. |
| Roaf, 1990 | This study explored previous literature and presented a critical overview of the thermal performance of the courtyard pattern. The aim of the study was to demonstrate the possible advantages and limitations of the courtyard pattern. | Courtyards can offer a comfortable environment. However, it is essential to consider two points. First, courtyard houses depend on a system of integrated elements that work together. An element alone may not achieve the targeted climatic performance. The second point is that achieving thermal comfort in courtyard houses depends on the climatic conditions of hot regions. It works better in a location where the highest air temperature is 37 ºC than in a location of temperature that can reach 50 ºC. |

### 3.2.1. Environmental principles of the courtyard pattern

The thermal efficiency of courtyard buildings depends on two prime principles: control of the exposure of buildings to solar radiation and provision of sufficient natural ventilation (Figure 3. 3) (Agha, 2015; Al-Hemiddi & Megren Al-Saud, 2001; H. Ali, Turki & R. Shaheen, Bahjat, 2013). The first principle is achieved in traditional courtyard buildings through having a compact urban fabric and shaded courtyards. The compact urban fabric makes buildings shielding each other, which protects their external surfaces from solar radiation (Behbood, Taleghani, & Heidari, 2010; Khan & Majeed, 2015).

Natural ventilation is achieved through two strategies. First, by using particular elements that help to bring the outdoor air into the indoor spaces and courtyards, which is, typically, the wind-catcher (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Behbood et al., 2010). The second strategy is to invest the buoyancy in courtyards by which warm air rising in reaction to the release of accumulated heat in the courtyards' surrounding surfaces. This helps to remove the heat from the courtyard, and causes the hot air of the surrounding indoor spaces to be replaced by colder air (M. I. Mohammed, 2010; Moosavi, Mahyuddin, Ab Ghafar, & Ismail, 2014).

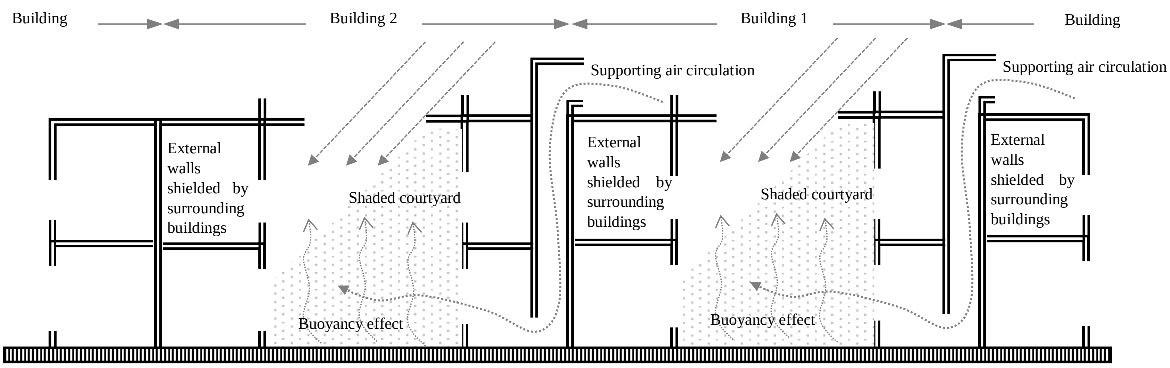



Figure 3. 3. Environmental principles of courtyard buildings

In this thermal behaviour, the courtyard space plays a critical role, which depends primarily on the geometric properties of courtyards: width, length, height and orientation (Al-Hafith, B K, Bradbury, & de Wilde, 2017; Ahmed S. Muhaisen & Mohamed B. Gadi, 2006). These properties affect the level of insolation and natural ventilation in courtyards. If the courtyard space does not respond to the climatic conditions of the surrounding environment in term of ventilation and insolation, the thermal performance of the courtyard building may become less efficient than other possible building patterns (Aldawoud & Clark, 2008; El-deep et al., 2012; Ratti et al., 2003).

### 3.2.2. Environmental elements of the courtyard pattern

To achieve thermally efficient courtyard buildings, a number of elements were integrally designed and built in traditional courtyard buildings to activate its two environmental strategies of shading and ventilation. These elements include: the courtyard space itself, wind-catchers, basements, a compact urban fabric, shanshool, high thermal mass envelope and water and planting elements (Figure 3. 4). These elements protect the building from the heat gain and support natural ventilation. Exploring the environmental role of these elements is essential to understand the environmental performance of the courtyard pattern and the possibility of investing them in current and future building designs.

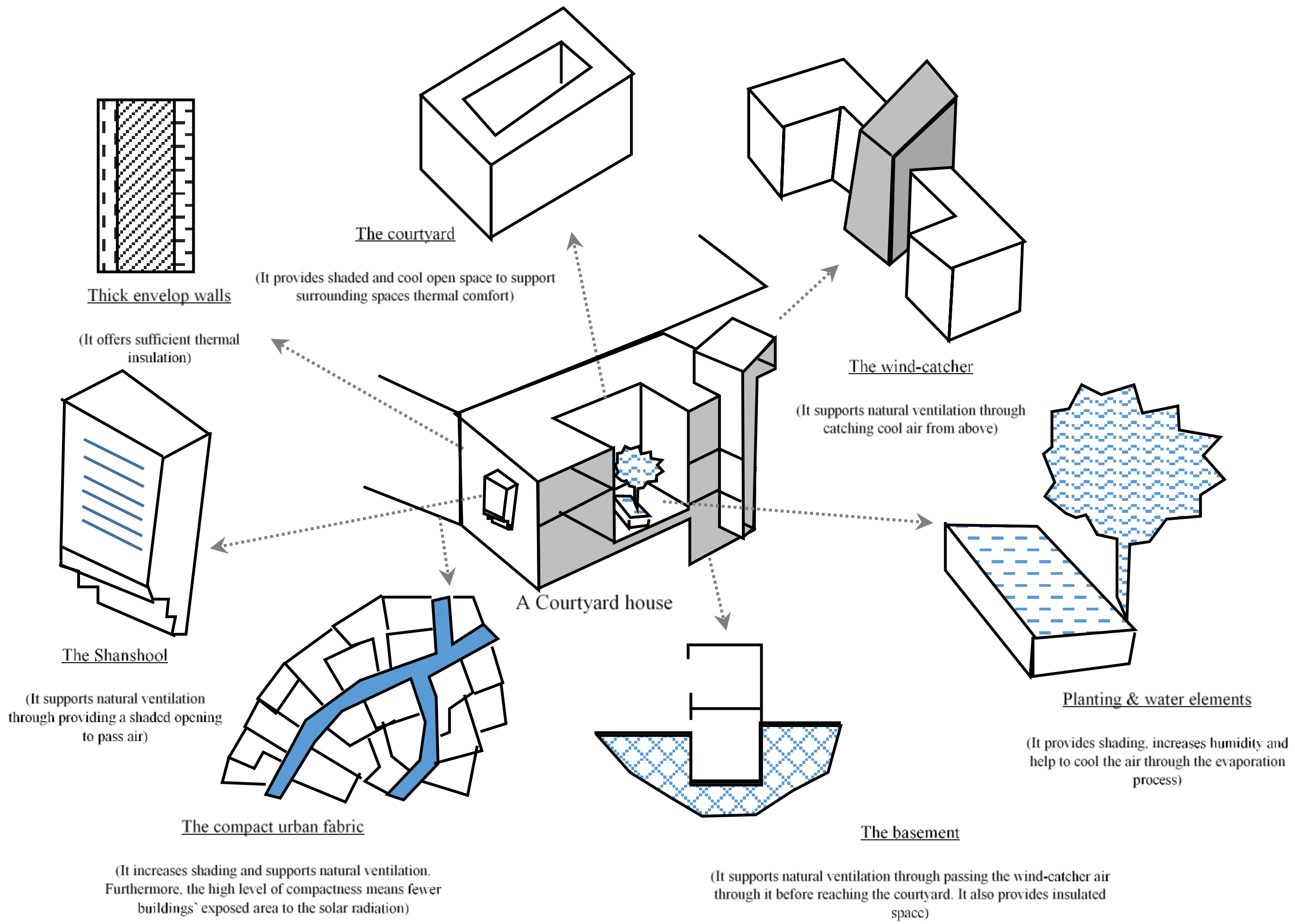



Figure 3. 4. Traditional courtyard buildings' environmental elements

The source: author depending on (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Behbood et al., 2010; G. Manioğlu & Yılmaz, 2008)

- Urban fabric compactness: the first design strategy works on the macro scale. Traditionally, courtyard buildings were built attached to form a compact urban fabric (Figure 3. 5). Buildings are closed to the outside and opened to the inside through their courtyards. The urban circulation networks are narrow organic paths and relatively large private and public plazas. This compact urban fabric provides high shading for buildings and paths, reduces the exposure to the sun and causes continuous air movement due to the pressure differences between the sunny and the shaded areas (B. Shaheen, R. & S. Ahmad, L., 2011). A study by T.H.Ali, 2017 showed that, in Mosul city, the temperature difference between the modern gridiron urban fabric and the traditional compact urban fabric is between 3°C to 9°C.

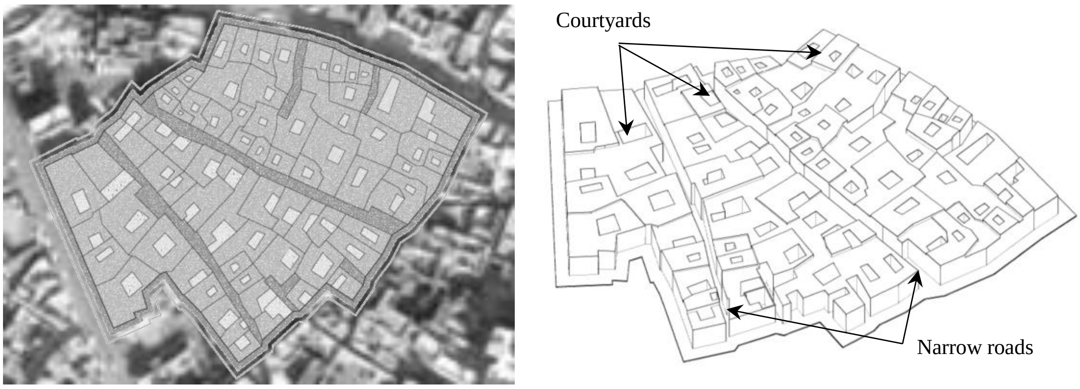



Figure 3. 5. An example of the traditional compact urban fabric – Mosul
Source: the author depending Google map

- Courtyard: this is the main environmental element of the courtyard pattern. It works integrally with the other elements to regulate the thermal conditions of buildings. In the morning hours, the courtyard is kept shaded by the surrounding walls, which keeps it cold. At night, the surrounding spaces and walls radiate their stored heat from the daytime to the sky through the courtyard. The hot air is replaced by cold air which helps to reduce the temperature and causes air movement in the courtyard and surrounding spaces (Figure 3. 6) (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Hameed, 2013; M. I. Mohammed, 2010).

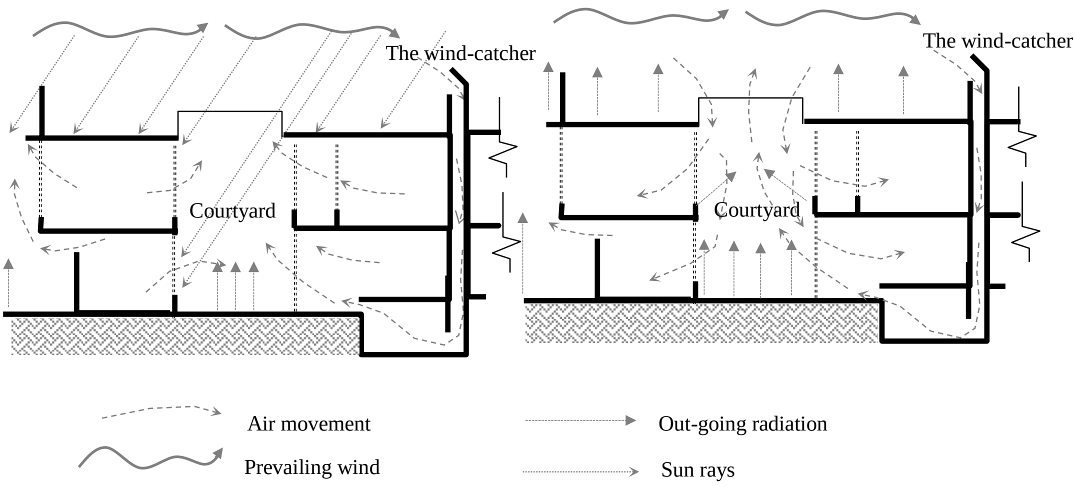



Figure 3. 6. Courtyard space performance during day time (left) and night-time (right)
Source: the author depending on (M. I. Mohammed, 2010)

- Wind-catcher: this element supports the courtyard by generating air movement and providing cold air for the building. It consists of an upper opening on the roof and a duct that is built across the longitudinal section of buildings opening up in the basement, which in turn is connected to the courtyard through windows. The upper opening of the wind-catcher is directed towards the prevailing wind in summer. By being moved across the basement, the air decreases in temperature before reaching the courtyard and surrounding indoor spaces (Figure 3. 6) (Al Jawadi, 2011; Hameed, 2013; B. Shaheen, R. & S. Ahmad, L., 2011).
- Building envelope: this is the main element that governs the heat exchange between the building and its surrounding environment. In traditional architecture, two factors affect the thermal performance of the envelope: its design elements and its construction materials. Regarding the former, the envelope elements were designed in a way that provides self-shading to the elevations. Traditionally, this has been achieved through ornamental details, the rough surfaces, and some projected elements. In addition, there was either no opening at all or only small ones to provide privacy and reduce solar access. Concerning the construction of the envelope, outside walls were constructed of stone or mud-brick with a thickness that ranges between 50 to 75 centimetres. These construction materials with this thickness delay the heat transfer and increase the thermal insulation (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Hameed, 2013; M. I. Mohammed, 2010).
- Mashrabia (Shanshool): this is a protruding spatial element to the outside on the first floor that has different functions, including supporting the thermal performance of the courtyard building. Typically, it is an ornamentally latticed opening to the outside alley. This composition enables it to provide an opening to the outside while maintaining privacy. Thermally, it provides shading for outside public paths and offers the opportunity for cross ventilation inside the building (Figure 3. 7). In some cases, it is used to get air from outside to inside and water pitchers were used inside the Mashrabia to mitigate the temperature of crossing air (Agha, 2015; H. Ali, Turki & R. Shaheen, Bahjat, 2013; Hameed, 2013; B. Shaheen, R. & S. Ahmad, L., 2011).

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Figure 3. 7. Mashrabia details and location

Source: (H. Ali, Turki & R. Shaheen, Bahjat, 2013; Hameed, 2013; B. Shaheen, R. & S. Ahmad, L., 2011)

- Water elements and planting: water and planting may help to increase the humidity and mitigate the temperature through evaporative cooling. For this purpose, in traditional buildings, plants and water elements, such as fountains, were provided in the courtyard space (Al Jawadi, 2011; H. Ali, Turki & R. Shaheen, Bahjat, 2013; Hameed, 2013).

- Basement: this is a space built to be under the ground level. The environmental function of the basement is to provide a thermally comfortable space in summer when all of the other elements and strategies fail to offer thermally comfortable conditions. The basement benefits from being surrounded by soil, which helps to neutralize the impact of outside temperature on the inside. Moreover, It works with the wind-catcher to mitigate the crossing air before reaching the courtyard space (Figure 3. 6) (H. Ali, Turki & R. Shaheen, Bahjat, 2013; M. I. Mohammed, 2010; B. Shaheen, R. & S. Ahmad, L., 2011).

### 3.2.3. Investing the courtyard pattern in modern architecture

From exploring the environmental principles and elements of the courtyard pattern, it can be seen that the traditional environmental principles may still be adopted to achieve thermally comfortable buildings. Architects can consider the strategies of reducing heat gain and achieving sufficient natural ventilation when designing thermally responsive buildings. However, not all of the traditional environmental elements can be easily adopted in modern buildings and urban contexts. For instance, achieving a compact urban fabric similar to traditional neighbourhoods may be out of architects' control as it may require changing the whole urban planning standards and regulations. It may be not be possible to design narrow roads as used in the old traditional urban fabric as these may not work for modern traffic and transportation. Moreover, it may not be possible to use the basement and wind-catcher in modern buildings, especially in the case of multi-family residential buildings. Nevertheless, this does not mean that it is not possible to adopt some of the traditional courtyard pattern's elements to be used with modern technologies to have thermally comfortable buildings.

The courtyard space, the principal traditional environmental element, may still help to have thermally efficient buildings. It increases the opportunity to have a protected external space from the solar radiation that provides lighting and ventilation for indoor spaces. Moreover, it can help to have a higher degree of the advantageous urban compactness than in the case of non-courtyard patterns. The courtyard space reduces the need to have large urban outdoor spaces as buildings will have their own outdoor spaces instead. These roles of the courtyard space can be supported by well-insulated walls and the use of planting and water elements. This conclusion supports incorporating courtyard spaces within multi-family buildings to improve their thermal performance. Based on these results, this research investigated the thermal conditions of courtyard spaces aiming to determine the level of thermal comfort that they can offer to occupants.

### 3.2.4. Thermal efficiency of courtyard spaces

The courtyard space plays two environmental roles in courtyard buildings. The first role is to offer a thermally comfortable outdoor space to occupants that can be used for domestic activities. The second role is to regulate the thermal conditions of courtyard buildings. Indoor spaces, in courtyard buildings, interact with the outdoor environment through the private sheltered outdoor space, the courtyard, instead of directly facing the harsh climatic conditions in typical urban spaces, which is the case of the non-courtyard buildings (Figure 3. 8). Accordingly, in comparison with outdoor urban spaces, the more comfortable courtyards are, the more comfortable indoor spaces will be. If courtyards offer less thermal comfort than typical urban spaces, the effect would be that courtyards do not, or negatively, affect the thermal conditions of buildings.

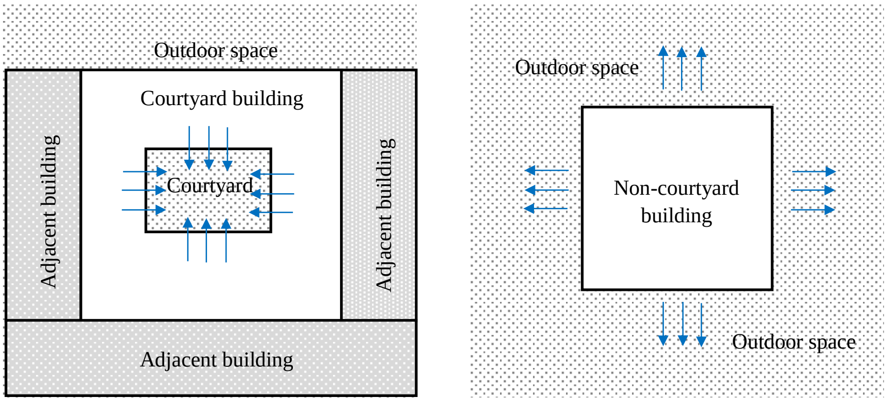


Figure 3. 8. Courtyards and non-courtyards buildings' interaction with the outdoor environment

In its examination of the thermal performance of the courtyard space, this research assessed the efficiency of courtyards in performing these two environmental roles. For this purpose, the research, first, explored the variables that affect the thermal conditions of courtyards, which are its geometric properties: length, width, height and orientation (Figure 3. 9) (Khan & Majeed, 2015; Muhaisen & B Gadi, 2006; Tabesh & Sertyesilisik, 2016). This research aimed to determine the potential impact of manipulating these geometric parameters to achieve the highest possible level of thermal comfort. These geometric parameters affect the thermal conditions of courtyards by affecting their insolation and natural ventilation levels:

- Insolation: it affects the thermal conditions of the courtyard in three ways. First, having different insolation levels affects the level of solar radiation penetration inside the courtyard space. Second, it governs the exposure of courtyard surfaces to solar radiation, which affect their temperature. As a result, there will be a combined effect on MRT in courtyards. The higher insolation level, the higher solar radiation penetration, the higher surfaces temperature and the higher MRT (Abass, Ismail, & Solla, 2006; Armson, Rahman, & Ennos, 2013; Atmaca, Kaynakli, & Yigit, 2007). Third, Insolation may have an impact on air temperature in courtyards by affecting the surface temperature. The warmer the surface temperature, the warmer the air layer close to that surface. Although there will be no correlations in large outdoor spaces, the surface temperature may still have an impact on air temperature in courtyards because of their relatively small size (Armson et al., 2013; Doick & Hutchings, 2013).
- Natural ventilation: this affects the thermal sensation of occupants in three ways. First, it affects the air movement inside courtyards, which subsequently impacts the air temperature around occupants and the sweat evaporation rates from their bodies. Second, it may affect the air temperature in courtyards by helping to replace hot air with cold air. Third, it affects the air temperature around the surfaces, which may lead to reduce the temperature of surfaces and, as a result, MRT (Amos-Abanyie, Akuffo, & Kutin-Sanwu, 2013; Catalina, Iordache , & Ene, 2013).

Accordingly, it can be concluded that manipulating the courtyard geometry leads to interrelated impacts on the thermal conditions of courtyards, which in turn affect the thermal sensation of occupants. This research did not explore the interrelated correlations between the various microclimatic factors, as it is out of its focus. The research focused on exploring the overall resulting impact of changing the geometric properties of courtyards on their microclimatic conditions: air temperature, MRT and air velocity. The research considered these three factors in investigating thermal conditions in courtyards because they are the factors that affect the globe temperature, which is the thermal comfort index adopted in this study to predict and assess the thermal comfort limits of Iraqis (see section 3.1.4).

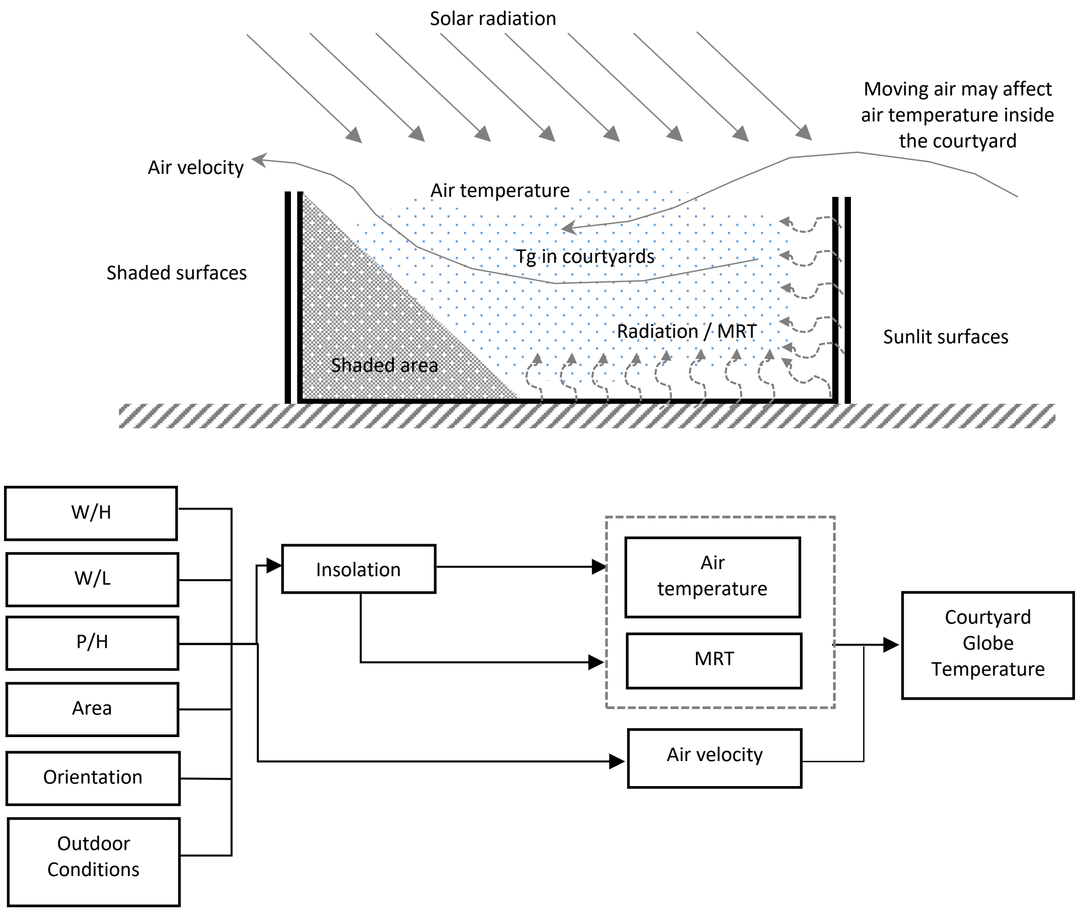


Figure 3. 9. The impact of courtyard geometry on its microclimatic conditions

### 3.2.5. Thermal comfort in courtyard spaces: knowledge gap (II)

The exploration of the potential thermal efficiency of traditional courtyard buildings indicates that courtyards can help to achieve more thermally comfortable environments than non-courtyard buildings. However, this conclusion does not determine to which extent courtyards can provide thermal comfort in hot climate regions in the modern age. Introducing the air-conditioning systems, and having the majority of people live in modern air-conditioned western-style buildings for the last decades would have changed people's thermal comfort thresholds (El-deep et al., 2012). People may not accept the thermal conditions that courtyards can provide, and, as a result, the idea of adopting courtyards may fail to achieve its climatic objective, which is to deliver thermally comfortable conditions (Roaf, 1990). Therefore, to have an accurate assessment of the thermal efficiency of courtyards, the current thermal comfort thresholds of people need to be considered.

This research conducted an intensive literature review to explore previous studies on this subject. Mousli & Semprini, 2016 analysed the thermal performance of a Syrian courtyard house during summer 2014 and 2015. They measured the thermal conditions in the courtyard space at different times and used ASHRAE standard 55 to assess the thermal sensation of occupants. Soflaei et al., 2017 investigated the thermal conditions in ten Iranian courtyard houses with a special focus on the impact of shading on providing thermal comfort. In assessing the thermal comfort levels in these courtyards, they used a thermal comfort threshold defined by an American comfort model for a climatic region supposed to be similar to the climate of the considered Iranian region. Ghaffarianhoseini, Berardi, & Ghaffarianhoseini, 2015 investigated the impact of courtyards' geometry, orientation, walls' albedo, and vegetation on thermal comfort. The study used the Envi-met simulation tool to test fifteen options with different height, width/height ratios and vegetation. PMV and PET thermal indices were used to assess thermal comfort. Nasrollahi, Hatami, Khastar, & Taleghani, 2017 conducted a similar study, but they used the PMV and the UTCI thermal comfort indices and examined fifty courtyard configurations. Similar approaches have been used by other studies, such as Martinelli & Matzarakis, 2017 in Italy, Berkovic, Yezioro, & Bitan, 2012 in Israel and Almhafdy, Ibrahim, Ahmad, & Yahya, 2015 in Malaysia. The results of all these studies show that courtyards can offer a more thermally comfortable environment than other building patterns. Moreover, they demonstrate that the geometric properties of courtyards, through affecting shading and natural ventilation, affect the thermal conditions of courtyards. However, the studies also demonstrate that courtyards may fail to offer thermally comfortable environments to occupants if their designs do not consider the climatic factors and conditions of their contexts.

Previous studies showed that, compared to the conducted research work on shading and natural ventilation in courtyards, limited research work has been done on determining the level of thermal comfort in courtyards. Moreover, although they have contributed to the knowledge regarding thermal comfort in courtyards, there are limitations in the conducted studies which might affect the accuracy and reliability of their results, especially in regard to the adopted methodologies. The exploration of the current study shows that the adopted methodologies by previous studies can be classified into two categories:

- The first category involves field measurements and the use of international thermal comfort thresholds to assess thermal comfort in a limited number of courtyard buildings.
- The second category uses simulation tools and universal static thermal indices for external spaces, such as the PMV, PET and UTCI, to judge the extent of thermal comfort in a number of various courtyard configurations.

Both methodologies might not yield an accurate assessment of the thermal efficiency of courtyards. There are two criticisms for approaches in the first category. First, international comfort standards might not be appropriate when applied to hot climate regions. Second, analysing a single or a limited number of courtyards neither gives a holistic view about the impact of courtyard geometry on the thermal sensation of its occupants nor the whole range of comfort extent possibilities. The reason is that they do not present the whole range of possible thermal conditions. As for the second category, the static model comfort indices might not be accurate in determining the thermal sensation of occupants for two reasons. First, it has been found by studies that the static model overestimates the extent of thermal discomfort in outdoor or naturally ventilated spaces, although these indices are developed for outdoor spaces (Monteiro & Alucci, 2006). Second, the courtyard space is a particular case of external or semi-external spaces. Its location in the building and function turn it into a private space for regular residential activities, such as eating, sitting or watching TV (Al Jawadi, 2011; Khan & Majeed, 2015; Salman, 2016). In addition, its size and design, typically, enable people to have a level of control over its microclimate conditions. They can affect air temperature, air velocity and humidity in courtyards by using fans, fountains or covering the courtyard temporarily for shading purposes (Figure 3. 10) (Salman, 2016). Neither of these two aspects is available in ordinary external or semi-external spaces for which the outdoor thermal indices have been developed. Accordingly, the distinctive features of the courtyard space may reduce the accuracy of the universal indices used by previous studies. It has been found that indices give accurate predictions only for the specific situations and locations where they have been developed (Aljawabra, 2014; Johansson et al., 2014; Nikolopoulou, 2011).

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Figure 3. 10. Controlling the courtyard space's microclimatic conditions

Source: Salman, 2016

More accurate results regarding the extent of thermal comfort in courtyards can be obtained by determining a wide range of possible thermal conditions of courtyards in a specific region and assessing them using thermal comfort thresholds determined for the people and climate of that specific region. In the case of this research, this approach requires knowledge of the thermal comfort limits of people in Iraq, which has not been explored in previous studies. Accordingly, it can be concluded that the conducted research work on thermal comfort in courtyards is limited. The knowledge gap in this field is that it is not clear to which extent courtyards can provide thermal comfort for people when used as residential spaces in Iraq.

## 3.3. Summary of chapter three

This chapter explored the subjects of thermal comfort and the thermal efficiency of courtyards through two sections. The first section demonstrates that thermal comfort is affected by six quantitative factors and a number of qualitative factors. Around the world, there are two comfort models in use to determine and predict the thermal sensation of people: the static model and the adaptive model. This research found that the latter is appropriate to address the aim of assessing thermal comfort in courtyards. The adaptive model considers a wider range of factors and gives more accurate results than the static model. As a thermal comfort index, the research adopts the Globe temperature for its accurate representation of the actual thermal sensation of people and appropriateness for assessing thermal comfort in courtyards. Regarding the courtyard, the second section of the chapter presented the potential thermal efficiency of courtyards, their environmental principles and elements, and the most important factors that impact the thermal performance of courtyards. Courtyards depend in their performance on having sufficient shading and active natural ventilation. Their performance also highly depends on the geometric properties of courtyard spaces, which include their height, width, length and orientation.

Based on the review of previous work, this research identified two knowledge gaps that need to be addressed to assess the thermal efficiency of courtyards in buildings in Iraq:

- There is no adaptive thermal comfort model suitable for Iraq that can be used to judge the thermal efficiency of courtyards.
- It is not clear to what extent courtyards can provide thermal comfort for people when used as residential spaces in Iraq.

# Chapter Four ….. Research methodology

# Chapter 4 – Research Methodology

This thesis aims to determine the thermal efficiency of courtyards in Iraq. To achieve this aim, the research develops an index that can be used to assess thermal comfort in courtyards: the Courtyard Thermal Usability Index (CTUI). This index determines the thermal comfort level in courtyards through determining the ratio of thermally comfortable hours to the total number of occupation hours of a specific period. To determine CTUI and to have a comprehensive and accurate assessment of the thermal advantages of courtyards, the research determined the thermal comfort limits of Iraqis and the possible thermal conditions of courtyards in Iraq in comparison to outdoor urban spaces in the country. This chapter presents the research methods through three sections:

- Courtyard Thermal Usability Index (CTUI).
- Thermal comfort survey in Iraq: research method (I).
- Simulating courtyards thermal conditions: research method (II).

## 4.1. Courtyard Thermal Usability Index (CTUI)

This research developed an index to determine thermal comfort levels in courtyards: the Courtyard Thermal Usability Index (CTUI). This index measures thermal comfort in courtyards by determining the amount of time courtyards offer thermally comfortable environments to occupants out of the total occupation time. CTUI is the ratio of thermally comfortable hours to the total number of occupation hours of a specific period, such as a season or a year. When determining the total occupation hours, it is assumed that courtyards are used in residential buildings during the day and evening times for various domestic activities, but not for sleeping. Therefore, the occupation hours considered in this research are from 8:00 AM until 10:00 PM (Salman, 2016). The higher CTUI value, the higher overall thermal comfort in courtyards. This research used this index to assess the annual thermal comfort of courtyards of different geometric configurations. However, unless the assessment includes making comparisons with the thermal conditions of other possible alternatives, determining the CTUI for courtyards neither ultimately indicate the thermal advantages of courtyards as usable domestic spaces, nor the possible thermal advantages of introducing courtyards to buildings. For this reason, this research compared the level of thermal comfort in courtyards with the level of thermal comfort in street spaces, which are the typical residential urban spaces in Iraq.

This comparison is underpinned by that, in courtyard buildings, indoor spaces interact with outdoor climatic conditions through the courtyard spaces. The alternative is to have non-courtyard buildings in which indoor spaces interact directly with outdoor conditions through the surrounding urban spaces. Accordingly, the alternative of courtyard spaces that needs to be examined is the urban space that surrounds non-courtyard buildings (Figure 3. 8). The typical urban outdoor space in Iraq is the street space of the Grid-Iron urban fabric in which buildings are arranged as rows of outward-oriented buildings along both sides of streets (Aladdin & Alsdjan, 2013; S. A. Ali, 2009) (Figure 4.1).

Figure 4. 1. Diagram and images showing typical modern urban fabric's outdoor spaces in Iraq

To apply CTUI to determine the thermal efficiency of courtyards, the research had to address two objectives:

- Determining the thermal comfort limits of Iraqis by developing an adaptive thermal comfort model for residential buildings.
- Investigating the possible thermal conditions of courtyards in Iraq and exploring the impact of their geometric properties on the thermal sensation of occupants.

To achieve these objectives, the research adopted two quantitative research methods. The first method was to conduct a thermal comfort survey in residential buildings to determine the current thermal comfort limits of Iraqi people. The second method was to conduct simulation experiments for a wide range of possible courtyards. These research methods were developed from an intensive literature review focusing on exploring research methods adopted by previous similar studies. Conducting a thermal comfort survey in people's actual environments has been the recommended practice when developing an accurate adaptive model that can be used to determine thermal comfort limits of people (Fergus Nicol et al., 2012). Simulation tools have been increasingly used to examine the thermal performance of buildings. They provide the opportunity to examine buildings in different scenarios and considering different factors, which may not be applicable in real-life experiments (Almhafdy et al., 2013; Bahar, Pere, Landrieu, & Nicolle, 2013). This research used the determined thermal comfort limits of Iraqis in the thermal comfort survey to judge the simulated thermal conditions of the examined courtyard configurations. For each courtyard, the research determined the annual CTUI. It ranked the examined courtyards according to their CTUIs to draw conclusions about the most promising configurations.

## 4.2. Thermal comfort survey in Iraq: research method (I)

This research developed an adaptive thermal comfort model to determine the thermal comfort limits of Iraqis. To achieve this objective, the research conducted a thermal comfort survey for a period of one year, from October 2017 to October 2018. The survey was conducted in a similar manner to a number of previous thermal comfort studies and with considering the guide ''Adaptive Thermal Comfort: Principles and Practice, 2012'', which is authored by three pioneers in the field of thermal comfort: Fergus Nicol, Michael Humphreys, and Susan Roaf. This book explains the procedures for conducting thermal comfort studies.

### 4.2.1. Study sample

Two criteria have been considered to develop a representative sample for the thermal comfort survey in order to obtain reliable and generalizable results. The first one was to select participants from different climatic regions in the country. The second one was to use a sample size of at least twenty participants giving a total of around 2000 thermal comfort votes. This is the threshold suggested by (Fergus Nicol et al., 2012) to obtain reliable results. It was not possible to select participants randomly as not every household/participant would be useful or would accept to participate in such a survey, especially if they do not know the researcher. The survey required regular communications between the researcher and participants for a year, which included sending thermal readings and answering inquiries on some occasions. The current unstable situation in Iraq made this task more complicated. Therefore, relatives and friends were contacted, with considering the two stated criteria. The majority of contacted people were hesitant to participate for two main reasons. First, there was a general lack of interest in participating in such a study. Second, people were not ready to commit to doing a survey for a full year, which was the anticipated duration of the survey. However, eight households from four cities accepted to participate. Two households were in Erbil, three in Mosul, two in Baghdad and one in Al-Ramadi (Figure 4. 2). Together, these households included more than 70 participants, which made it possible to exceed the recommended sample size threshold suggested by (Fergus Nicol et al., 2012), which is 2000 votes. They were from different climatic regions which was useful to indicate possible thermal comfort variations around the country.

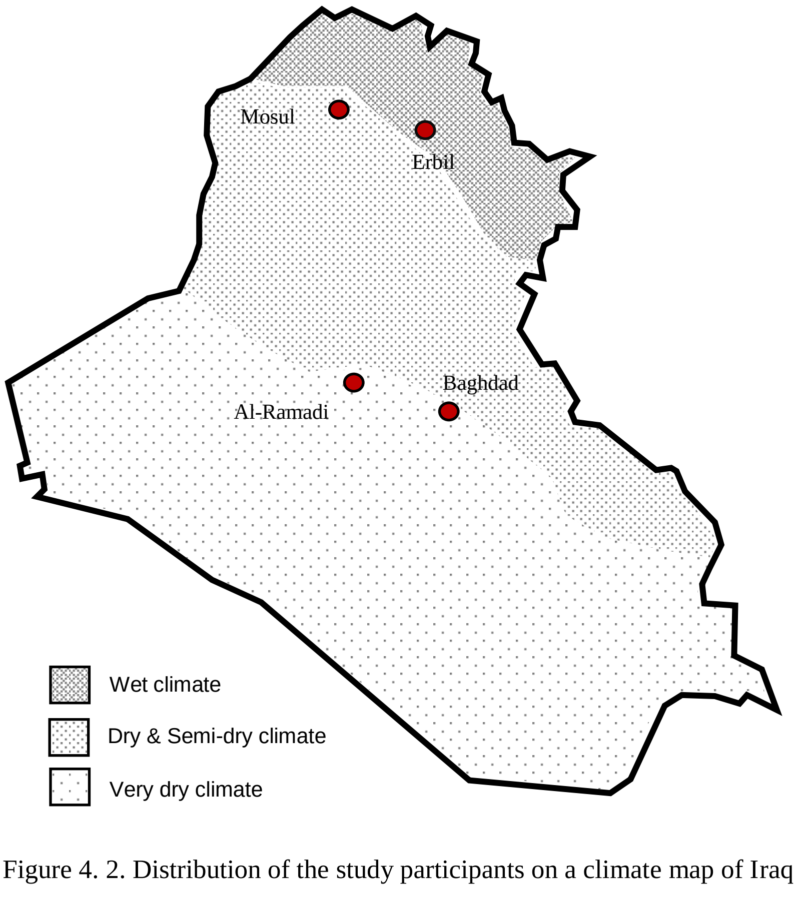


Figure 4. 2. Distribution of the study participants on a climate map of Iraq

All of the participated households live in non-courtyard houses, which included row and semi-detached houses. The survey was planned to be conducted in indoor and outdoor spaces (Figure 4. 3). All of the surveyed indoor spaces are of mixed-mode ventilation mode. The aim of the survey was to develop an adaptive thermal comfort model that can be used to predict the thermal comfort limits of Iraqis in their residential environments.

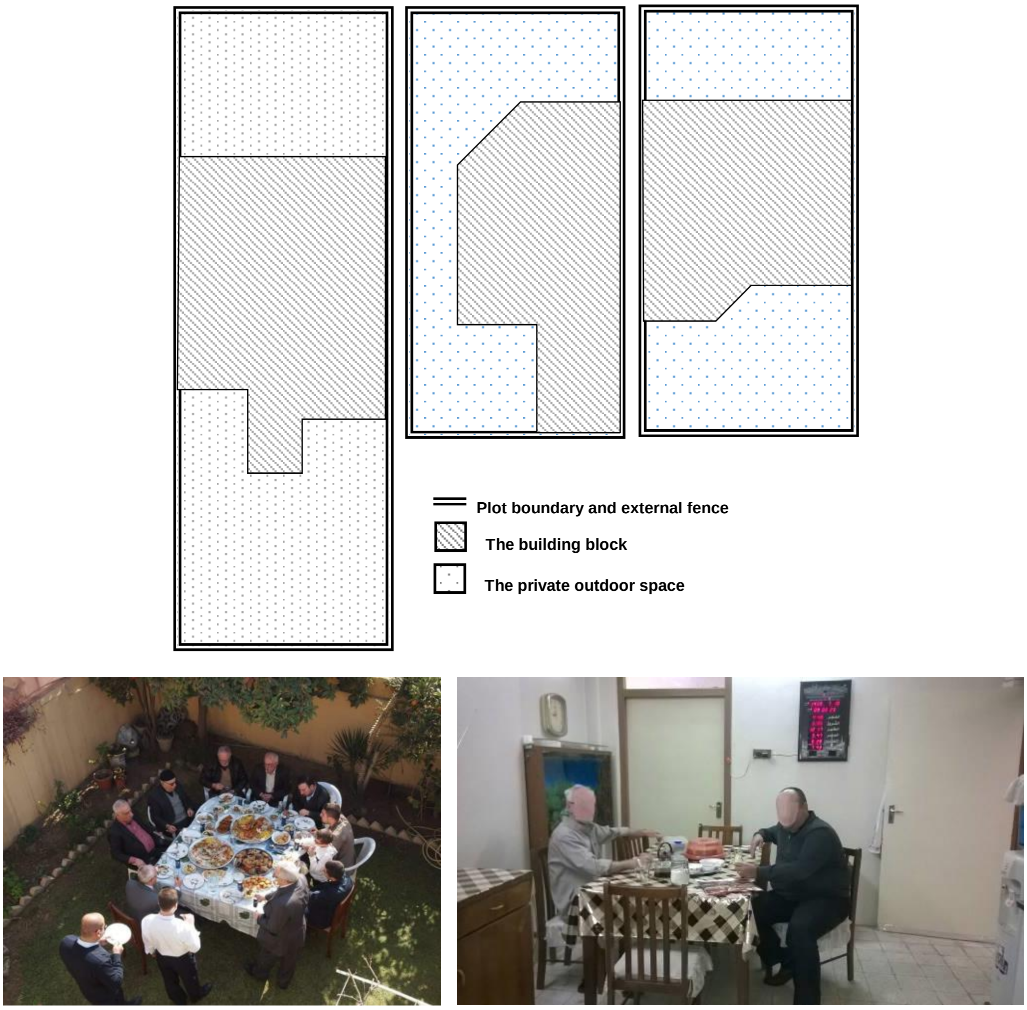


Figure 4. 3. Examples of the surveyed layouts and spaces

### 4.2.2. Instruments & survey procedures

As stated in chapter three, this research selected the globe temperature to be its thermal comfort index. Accordingly, the measuring instrument was selected to measure the globe temperature directly. Calibrated Extech HT30 Meters were purchased and delivered to the participants in Iraq (Figure 4. 4). This instrument has been used in similar studies (Albadra, Vellei, Coley, & Hart, 2017; Kamra, Manu, Rawal, & Soladhara, 2019; Manu et al., 2016). It is manufacturer calibrated, easy to use, with acceptable accuracy, and measures all of the required factors. Participants were asked to take the measurements and record their thermal comfort votes on the survey form simultaneously. They were directed to fill the survey in their residential indoor and outdoor spaces while doing their normal daily activities. They were guided not to take measurements and record votes unless they and their spaces were well-settled. This can be achieved by allowing at least half an hour before conducting the survey in case there are changes in their status. For instance, they were asked not to do the survey with a person who has just finished doing hard work, just woken up or just entered from outdoors, if the measurement is for indoor spaces. Regarding spaces, they were asked not to carry out the survey if there is a sudden dramatic change in indoor conditions, which may occur in Iraq due to the frequent electricity power interruptions (Rashid et al., 2018). Special attention was given to the required time gap when moving the instrument from indoor spaces to outdoor spaces to enable correct measurements.  These instructions were confirmed in the survey form as failing to give the required time gap may lead to having inaccurate comfort votes (Salata et al, 2016).

| Specifications | Range | Accuracy |
| --- | --- | --- |
| Black Globe Temperature (Tg) | 0 °C -80°C | 2°C |
| Air Temperature (Ta) | 0 °C -50°C | 1°C |
| Relative humidity | 0 to 100% | 3% |
| The ball size | 40mm diameter, 35mm high | |

Figure 4. 4. Measuring instrument (up) and comfort survey (down)

### 4.2.3. Survey form

A survey form was developed based on available literature and following suggestions from a dedicated thermal comfort survey guide (Fergus Nicol et al., 2012). Preparing the survey forms from successful previous surveys and based on specialized guidance guarantee the reliability and validity of the survey (Fink, 2006; Thyer, 2010). The survey was made as easy and straightforward as possible to encourage participants to record as many readings as possible. It included asking participants to measure thermal conditions, define any heating or cooling systems used during the survey time, define the nature of the space (indoor/outdoor) and record their thermal sensation on a seven-point scale from very cold to very hot (Figure 4. 5). The survey form did not ask participants about their clothing level or activities for two reasons. First, this adds unneeded complexity to the survey. Second, regarding clothing, in the adaptive thermal comfort model, clothing is one of the adaptation options for occupants, which are already implied in its equation. Regarding the activity level, this is a neutral factor in this research as the aim is to determine the overall comfort limits in residential buildings. The survey did not aim to determine the specific thermal comfort limits for specific spaces and activities.

For the ease of survey forms distribution and collection, the survey form with instruction sheets was sent electronically to all of the participants who accepted to participate in the study. They were asked to send the filled forms electronically to the researcher. It was confirmed to the participants that, although they had accepted to participate in the study and commit for a year, they would have the freedom to withdraw from the study and return the device at any point without explanation and without any consequences.

ENVIRONMENTAL BUILDING WITH PLYMOUTH UNIVERSITY

## استبيان تعريف حدود الراحة الحرارية في العراق

## Thermal comfort limits survey in Iraq

<u>وصف الاستبيان</u>

يهدف هذا الاستبيان الى تحديد حدود الراحة الحرارية في العراق وتغيرها على مدار السنة.

يرجى من حضرتكم مليء المعلومات في الجدول ادنها بالاستعانة بجهاز قياس الظروف الحرارية المرسل اليكم.

يرجى من كل مشارك مليء المعلومات الخاصة به ثلاث مرات على الاقل في الاسبوع في اي وقت واي فضاء سكني.

للحصول على نتائج صحيحة, يرجى من حضرتكم قراءات تعليمات الجهاز و الملاحظات التالية:

- يتوجب تسجيل الظروف الحرارية والاحساس الحراري سوية في نفس الوقت.
- يتوجب ان لا تزيد المسافة الافقية بين جهاز القياس والمشارك عن 3م و بارتفاع 1.5 – 1.1م, بحيث يتم تعريض الجهاز لنفس الظروف الحرارية للمشارك.
- في حال تغير مكان الجهاز او الظروف الحرارية, يتوجب مراعاه ان الجهاز يحتاج فتره 15 دقيقة للوصول الى حالة الاستقرار واعطاء قراءات صحيحة.
- يتوجب من كل مشارك ان يكون قد وصل الى حالة استقرار من حيث الفعالية السكنية والتوزان مع الظروف الحرارية المحيطة قبل تسجيل الاحساس الحراري.
- في حال تغير الظروف الحرارية بسبب تغير نظام التكييف, و بحسب مساحة الفضاء ونظام التكييف المعتمد, يتوجب اعطاء وقت كافي لتستقر ظروف الفضاء الحرارية قبل تسجيل الاحساس الحراري.
- يتوجب اعطاء كل مشارك رمز تعريفي يتضمن اول حرفين من اسمه وسنة تولده (مثل MO86). في حال كون المشارك ضيف, فانه يرجى اضافة حرف ( G ) الى رمزه التعريفي.
- يتوجب ان لا تقل الفتره بين تسجيل قياس واحساس حراري واخر لنفس المشارك عن ساعة واحده.

| | المشارك The participant | الوقت و التاريخ Date & time | | الظروف الحرارية Thermal conditions | | | | نظام التكييف / التهوية (في حالة الفضاء الداخلي) Air-conditioning / ventilation system (Indoor spaces) | | | | | وصف الفضاء Space description | | الاحساس الحراري Thermal sensation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | التاريخ Date | الوقت Time | الاجهاد الحراري WBGT Heat stress (WBGT) (C°) | درجة حرارة مركية TG Tg(C°) | درجة حرارة الهواء TA Ta (C°) | الرطوبة النسبية Humidity (%) | جهاز تكييف Air-condition | مبردة Evaporative cooler | مروحة Fan | مدفئة Heater | تهوية طبيعية Natural ventilation | فضاء داخلي Indoor space | فضاء خارجي Outdoor space | حار جداً Very Hot | حار Hot | حار قليلاً Slightly hot | مريح Comfortable | بارد قليلاً Slightly cold | بارد Cold | بارد جداً Very cold |
| 01 | | | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | |

لارسال القياسات والتواصل مع الباحث, يرجى استخدام عناوين الاتصال التالية:

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Figure 4. 5. The survey form

This survey form was used to record thermal conditions in indoor and outdoor residential spaces and, simultaneously, occupants' thermal sensation

### 4.2.4. Outdoor meteorological data

Developing an adaptive thermal comfort model requires correlating the thermal conditions of living environments and the thermal sensations of people with the outdoor running mean temperature. For this purpose, the annual hourly air temperature and maximum and minimum temperature for Baghdad were obtained from the Iraqi Meteorological Organization (IMO). The outdoor temperature data of Mosul, Erbil and El-Ramadi were collected from the www.accuweather.com website. The reason is that obtaining the hourly data of these three cities would have required a physical visit to the Iraqi Meteorological Organization office, which was not possible for the researcher. The data on accuweather.com was validated by comparing a random sample of its data with Baghdad's data from the IMO. To check the reliability and the accuracy of data on accweather.com website, the research conducted the Coefficient of Variation for the Root Mean Squared Error (CV-RMSE) statistical test, which can be used to measure the accuracy of predicted values in comparison to actual measurements. This coefficient gives a percentage showing how close the prediction is to real-life conditions. The lower the resulting values, the more accurate the predictions (Bagneid, 2010; Haberl & Bou-Saada, 1998). The test showed that the online data used in this study agrees with IMO's data (Figure 4. 6). The CV-RMSE is 0.06, which indicates that the margin of error in the accweather.com's data is only 6%. Accordingly, the collected data from these two sources were used to be correlated with the thermal sensations and thermal conditions recorded by the participants to develop an adaptive comfort model for residential buildings in Iraq.

$$CV\text{-}RMSE = ((\sum (D_a - D_d)^2 / P - 1))^{0.5} / D_{aa} \quad \text{----- The validation equation}$$

*where :*

$D_p$ = accweather.com data, $D_a$ = IMO data, $D_{aa}$ = the average value of the actual data, P = the number of data points

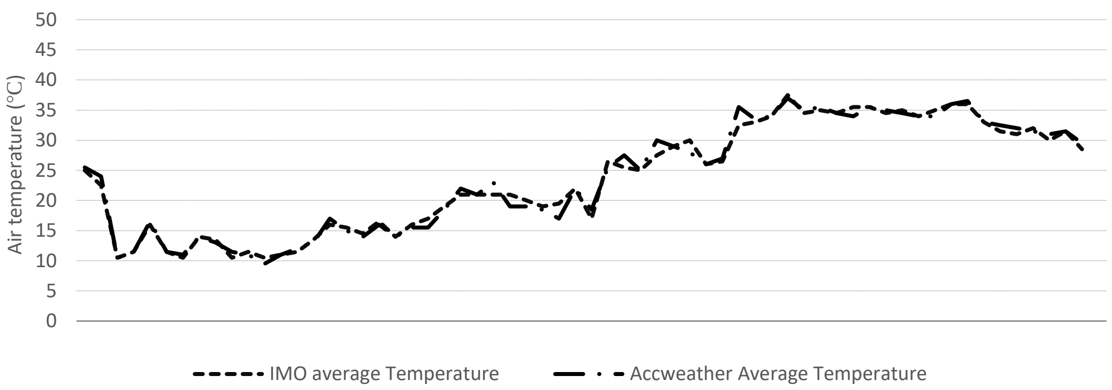



Figure 4. 6. Comparison between IMO and accuratewether.com's average temperature in Baghdad

### 4.2.5. Comfort survey analysis approach

This research determined the comfortable temperature range for Iraqis in their residential environments. In the analysis, it was considered to differentiate between the results of outdoor spaces and those from indoor spaces, and the results of the latter in the air-conditioning and natural ventilation modes. In addition, the results of each of the participated cities were analysed separately and then an overall analysis was done. This analysis approach enabled the research to compare the thermal conditions and thermal sensations in various spaces and ventilation modes, and for each of the participated cities. Data were arranged and analysed using Microsoft Excel and IBM SPSS statistics 24 packages. A regression analysis was used to correlate the recorded globe temperature readings and thermal comfort votes by participants with the outdoor mean air temperature to develop an adaptive thermal comfort model for Iraq, which is presented in the next chapter.

## 4.3. Simulating courtyards thermal conditions: research method (II)

In parallel with the thermal comfort survey in Iraq, this research investigated the thermal performance of courtyards in the country. The aim of this part of the investigation was to determine the potential thermal conditions of courtyards in the country, including globe temperature. The results of investigating the thermal performance of courtyards and the thermal comfort survey were correlated to judge the ability of courtyards to provide thermal comfort in Iraq. In investigating the thermal performance of courtyards, the research had the following objectives:

- Determining the impact of changing the geometric properties of courtyards on their thermal conditions: air temperature, air velocity and MRT. The geometry of courtyards has been found by previous studies to be of significant impact on the thermal conditions of courtyards. These three microclimatic variables are the component of globe temperature, which was used by this research as a thermal comfort index.
- Exploring the variety of thermal conditions in courtyards around the country in order to determine the applicability of the results and conclusions of this research nationwide.

The research conducted a set of simulation experiments using two simulation tools: IES-VE and Envi-met 4.2. Baghdad was taken as the case study for which the majority of the simulation experiments were conducted. Baghdad is the capital of the country and has a population of 7.5 million, which is around 20% of the total population of the country. Furthermore, six other cities in Iraq, representing the range of climatic conditions in the country, were examined to determine the applicability of the results of Baghdad to the rest of the country. This section of this chapter presents the aspects that are related to the design and conduction of the simulation experiments. This includes presenting the examined research variables, the used simulation tools, the simulation settings and the approach to data analysis.

### 4.3.1. Research variables & investigation steps

To have a comprehensive understanding of the thermal performance of courtyards, the research investigated and analysed the correlations between the various performance-related factors of courtyards explored in the previous chapter. Through seven steps (Table 4. 1), the research analysed the impact of courtyard geometry on insolation, air velocity, air temperature, MRT and globe temperature. Moreover, it analysed the impact of air temperature, air velocity and MRT on globe temperature to identify the dominant factors that have the most substantial impact on the thermal sensation of occupants in courtyards. This investigation enabled the research to tackle the impact of changing each geometric property on each of the three relevant microclimatic factors to develop a complete picture of the impact of courtyard geometry on the thermal sensation of occupants. All of the variables were studied on an hourly basis over the examined period in the simulation experiment. Hourly analysis of thermal conditions in courtyards allows accurate determination of the period of thermal comfort that courtyards may offer to occupants.

Table 4. 1. Research variables and investigation steps

| Step | The details | Independent variable | Dependent variable (courtyards) |
|---|---|---|---|
| 1 | Analysing the impact of courtyard geometry on insolation | Courtyard Width/Length (W/L)<br>Courtyard Width/Height (W/H)<br>Courtyard Periphery/Height (P/H)<br>Courtyard area<br>Courtyard orientation | Insolation |
| 2 | Analysing the impact of courtyard geometry on air velocity | | Air velocity |
| 4 | Analysing the impact of insolation and courtyard geometry on MRT | | MRT |
| 5 | Analysing the impact of courtyard geometry on air temperature | | Air temperature |
| 6 | Analysing the impact of courtyard geometry on globe temperature | | Globe temperature |
| 7 | Analysing the impact of air temperature, MRT and air velocity on globe temperature. | Air temperature, MRT, air velocity | Globe temperature |

### 4.3.2. Simulation tools

This research analysed the annual thermal performance of different courtyard geometric configurations in Iraq. The research used simulation tools as this research method provides the opportunity to evaluate and determine the impact of various factors on building performance in different scenarios without the limitations of field experiments (Almhafdy et al., 2013; Bahar et al., 2013). Exploring previous literature shows that a large number of simulation tools, such as Envi-met, Energy Plus, IES-VE, TRNSYS and DesignBuilder, have been developed and used in buildings simulation studies (IBPSA; Sousa, 2012; de Wilde et al., 2009). However, the available simulation tools differ in their features and characteristics, such as their availability, user interface, simulation equations and assumptions (Bahar et al., 2013; Sousa, 2012). This makes finding an appropriate simulation tool a critical issue in achieving the objectives of the research. This study aimed to use a simulation tool that considers and determines the interaction of the various explored factors in courtyards. To select an appropriate simulation tool for this purpose, this research conducted an intensive review to explore potentially useful simulation tools. Table 4. 2 lists fifteen recent studies showing the range of simulation tools that have been used to determine the thermal conditions of courtyards or similar spaces. It can be seen that previous studies used a range of simulation tools, which has included: Envi-met, Solene, ESP-r, DesignBuilder, EnergyPlus (Table 4. 2).

Table 4. 2. Simulation tools - literature review

| The study | Used simulation tool | Justification |
|---|---|---|
| Ridha, 2017 | ENVI-met | This tool is used to simulate microclimatic conditions of urban spaces, including courtyards. It depends on well-based physical and fluid dynamics rules and principles in considering the impact of wide-range factors of outdoor spaces, which are not offered by other similar simulation tools |
| Peron, De Maria, Spinazzè, & Mazzali, 2015 | | |
| Taleghani, Kleerekoper, Tenpierik, & van den Dobbelsteen, 201) | | |
| Hedquist & Brazel, 2014 | | |
| Berkovic et al., 2012 | | |

| | | |
|---|---|---|
| Krüger, Minella, & Rasia, 2011 | | |
| Malekzadeh, 2009 | | |
| Huttner, Bruse, & Dostal, 2008 | | |
| Ali-Toudert & Mayer, 2006 | | |
| Gobakis & Kolokotsa, 2017 | Coupling (ESP-r) and (ENVI-met) | Indoor space simulation tools assume generic outdoor climatic conditions. This has led to inaccurate results. Accordingly, some studies have worked on simulating local outdoor microclimatic conditions of the examined buildings to feed the indoor space simulation tools. Envi-met has been one of the typical tools to simulate outdoor microclimatic conditions. Programming languages have been used to develop algorithms that couple indoor/outdoor simulation models. |
| Morille, Musy, & Malys, 2016 | Coupling Solene thermo-radiative model and Saturne code model | |
| Malys, Musy, & Inard, 2015 | | |
| Gros, Bozonnet, & Inard, 2014 | Coupling Envi-BatE and Solene | |
| Peng & Yi, 2014 | Coupling DesignBuilder and Envi-met | |
| X. Yang, Zhao, Bruse, & Meng, 2012 | Coupling Envi-met & EnergyPlus | |

From these studies, it can be seen that simulation experiments were either conducted using one simulation tool, typically Envi-met, or through coupling two simulation tools. Regarding the latter approach, the purpose is to provide a high level of accuracy for the dynamic heat exchange and transfer between indoor and outdoor spaces. In this kind of simulation experiments, one tool is used to determine outdoor conditions and the other for indoor conditions. The outputs of each simulation tool are used as inputs for the other. Results are correlated to produce final conclusions. This simulation approach was not adopted by this research for two reasons. First, it requires in-depth programming skills to manage the correlation between two simulation tools which is beyond the resources of the current study. Second, this research did not focus on the correlations between the courtyard space and surrounding indoor spaces, but on the impact of courtyard geometry on microclimatic conditions. Accordingly, this research did require interacting simulations but using one simulation tool to determine each of its variables.

This study explored various simulation tools that can be used individually to serve its aim of determining the air temperature, air velocity, MRT, insolation and globe temperature in courtyards. This included Envi-met 4.2, DesignBuilder, IES-VE, EnergyPlus, Solene, and ESP-r. The possibility of using these simulation tools for the current purposes was explored through a review of previous studies and by contacting support teams of these simulation tools. The results of the exploration showed that the most appropriate tool to determine air temperature, air velocity and MRT in courtyards for this study is Envi-met 4.2. Alongside using Envi-met 4.2, this study used IES-VE to simulate the insolation level in courtyards. Based on the results of Envi-met 4.2 simulation, the research used an equation developed by previous literature to determine globe temperature depending on the air temperature, MRT and air velocity (Moss, 2015):

$$Tg = (MRT + 2.35 \times Ta \times (Av)^{0.5}) / (1 + 2.35 \times (Av)^{0.5})$$

*Where:*
*Tg: Globe Temperature, Ta: Air temperature, Av: air velocity*

This adopted approach by this study to conduct its simulation experiments is underpinned by the following exploration results:

- DesignBuilder and IES-VE have been validated and widely used in simulation studies (Almhafdy et al., 2013; Ferrante, 2016; Sousa, 2012; Taleb & Sharples, 2011). However, the exploration revealed that both tools are not appropriate for simulating the microclimatic conditions of courtyard spaces. They are both designed to simulate indoor spaces.
- EnergyPlus, Solene, and ESP-r allow custom-made simulation experiments. However, they are not suitable for this study because they require programming skills and in-depth knowledge of related physics which are both out of the available resources.
- Envi-met is a Computational Fluid Dynamics (CFD) simulation tool that simulates the interactions between building surfaces, air and natural elements in urban spaces, such as streets, plazas and courtyards (Berardi, 2016; ENVI-MET, 2017). It depends on well-based physical and fluid dynamics rules and principles in considering the impact of wide-range effective factors on outdoor spaces. Among the factors that it considers are longwave and shortwave radiation, air temperature, wind velocity, humidity and vegetation (Hedquist & Brazel, 2014; Malekzadeh, 2009), which are not comprehensively considered by other similar simulation tools (Taleghani et al., 2015). The software versions before version 4.2 had a number of drawbacks, which included, primarily, the problem of determining heat storage in walls during the day-time and heat release during the night-time, which had led to inaccurate results (Berkovic et al., 2012); (Hedquist & Brazel, 2014). However, this problem has been solved by improvements to the software over recent years (Simon, 2016). Recent studies have validated its results by making comparisons between software simulation outputs and real-life measurements (Hedquist & Brazel, 2014; Nasrollahi et al., 2017; Ridha, 2017).
- The used versions of Envi-met does not include an option to measure the insolation level in courtyards. For this reason, this research used IES-VE simulation tool to determine this variable.
- Globe temperature was determined through an equation as it is not possible to be determined directly by the explored simulation tools

#### 4.3.3. Simulation experiments

A. Used simulation tools

This research used Envi-met simulation tool to conduct the main body of the simulation experiments, which included determining air temperature, MRT and air velocity. To determine the insolation in courtyards, the research used IES-VE as the used version of Envi-met does not offer to determine insolation levels. The use of Envi-met and IES-VE did not include using their results to feed the simulation of each other, but outcomes were integrated at the analysis stage (Figure 4. 7). Using two simulation tools did not affect results integrity or conclusions validity. First of all, the research ensured the simulation of identical courtyard forms and integrated simulation configurations for both of the two simulation tools, as presented in the following sections. Second, the aim of using IES-VE was only to determine the insolation levels in courtyards, not their microclimatic conditions. The results of Envi-met and IES-VE were used at the analysis stage to determine the impact of changing courtyard insolation on MRT, and the resulted globe temperature. Having these variables determined in two tools did not have a negative impact on accurately determining that correlation as each variable was determined separately using one tool. Using more than one simulation tool may generate inconsistency when multiple tools are used to determine the values of a single variable. The reason is that simulation tools use different assumptions and principles in their simulation processes (Hedquist & Brazel, 2014; Malekzadeh, 2009).

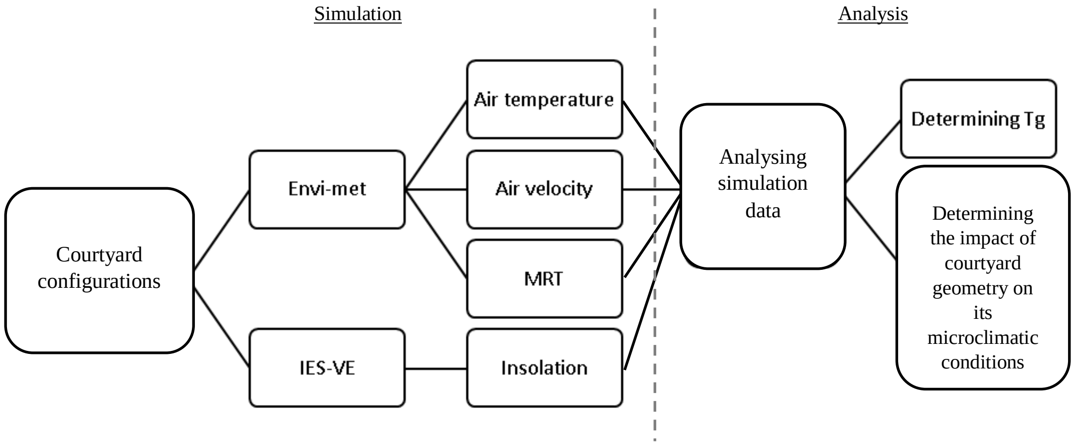



Figure 4. 7. Use of Envi-met and IES-VE simulation tools in the research

B. Examined courtyard configurations & urban spaces

- Courtyards: this research aimed to determine the whole range of possible thermal conditions in courtyards in Iraq and the impact of manipulating courtyard geometric configurations on their thermal conditions. However, due to limitations of time and resources, the study examined 360 geometric configurations (Figure 4. 8). Although they do not include all possible courtyard forms, the 360 configurations represent a wide range of possible courtyards. The manipulated and examined geometric properties included the following:
    - Courtyard area: six different areas were examined ranging from a 10m$^2$ courtyard area, which can be used as a private courtyard for a housing unit, to 100m$^2$ courtyard, which can be used as a shared courtyard for a residential building.
    - Width/Length ratio: five different ratios were examined ranging from a narrow courtyard with 1:10 ratio to a square courtyard.
    - Courtyard long axis orientations: four main geographic orientations were examined, which included north-south, east-west, northeast-southwest and northwest-southeast. Intermediate orientations can be extrapolated from the performance of courtyards in these four master orientations.
    - Height: courtyards with 3m, 7m and 10m heights were examined, which represent the typical height of one-storey, two-storey and three-storey courtyards. This affects the ratios of Width/Height (W/H) and Periphery/Height (P/H).

The 360 options stem from exploring the variations of these effective geometric properties of courtyards on their thermal conditions:

$$6 \text{ areas} \times 5 \text{ W/L ratios} \times 3 \text{ heights} \times 4 \text{ orientations} = 360$$

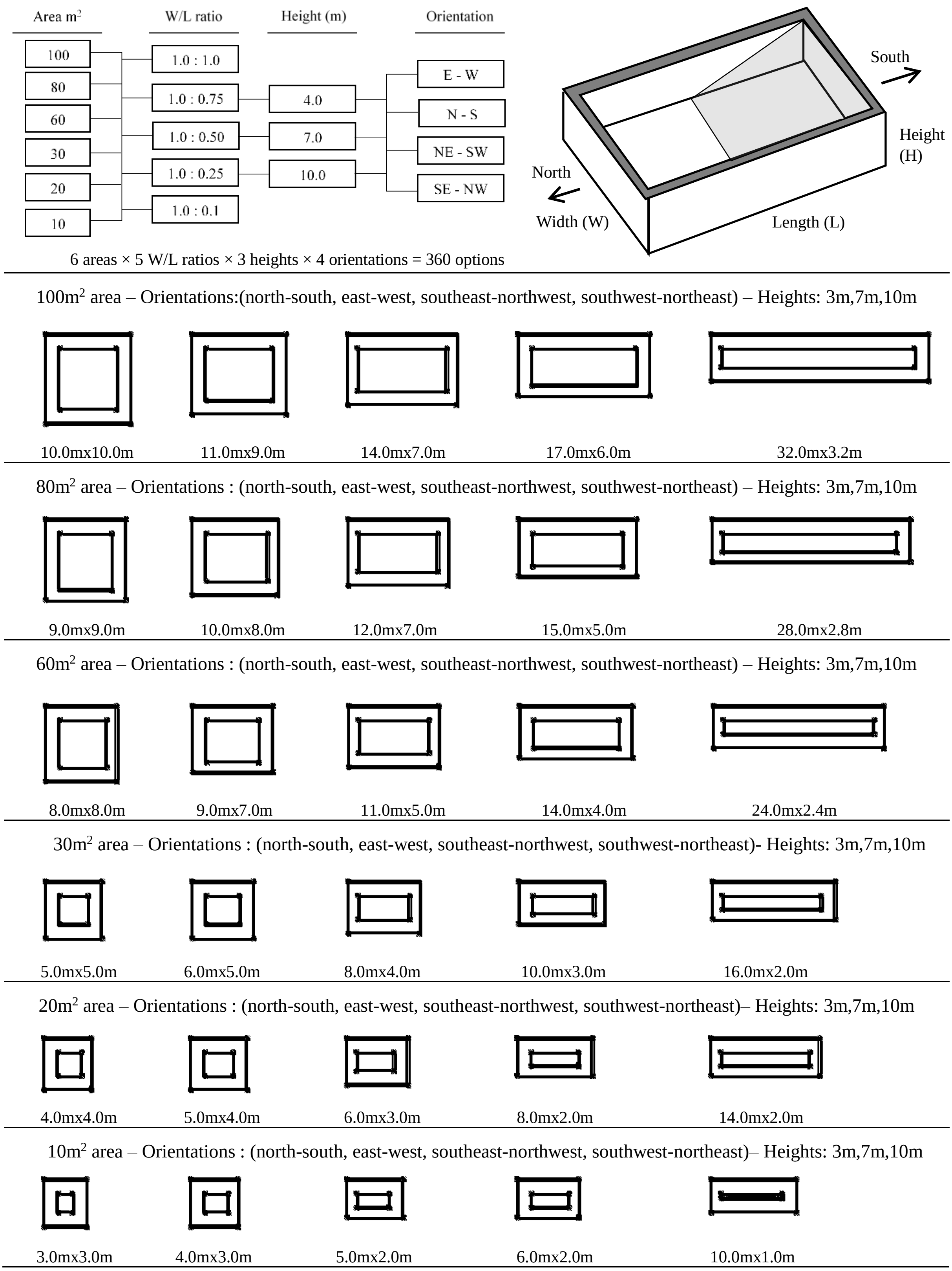



Figure 4. 8. Tested courtyard configurations

These 360 courtyard configurations were modelled in the simulation tools as buildings with central courtyards (Figure 4. 9). The width of the indoor space strip around the courtyard was unified in all of the examined courtyards to neutralize its possible impact on the thermal conditions of courtyards. In Envi-met the microclimatic conditions were observed in the middle of courtyards at 1.5m height. This location was selected to represent the average conditions in courtyards. In IES-VE, the research measured the sunlit area as a percentage to the total surface area for each of the courtyard’s four walls and the ground surface.

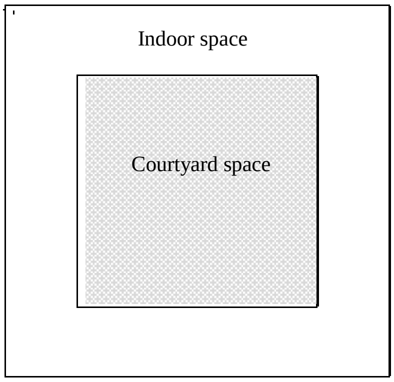



Figure 4. 9. An example of the modelled courtyard buildings in the simulation tools

- Urban spaces: this study compares the thermal conditions in typical residential roads, representing the thermal conditions of modern urban spaces, with conditions in courtyards. This comparison allows to determine the thermal conditions with which indoor spaces interact. For this purpose, in Envi-met simulation experiments, the study examined typical cases in Iraq, which included two modern urban fabric cases. The two simulated cases are of 9m and 12m wide streets (Figure 4. 10). Building heights were set to be between two to three storeys, which is the typical residential building height in the country (Aladdin & Alsdjan, 2013). The construction materials and forms of the street and the building were set to be in correspondence with the Iraqi context. The street is black asphalt and buildings were built of light-colour concrete blocks and bricks.

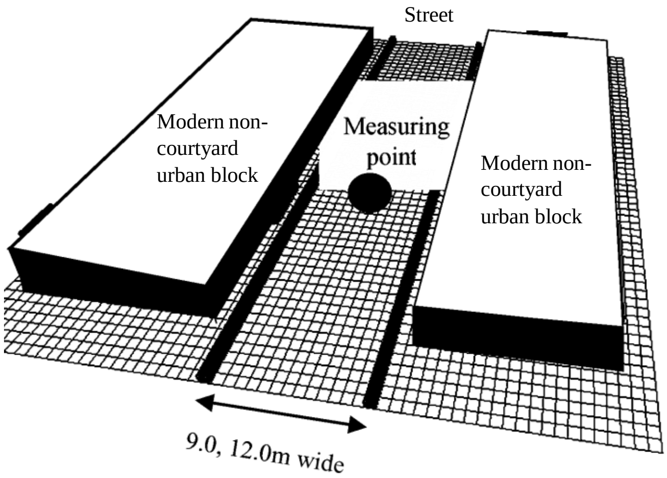



Figure 4. 10. Simulated modern urban fabric model in Envi-met

C. Simulated cities' climatic conditions

This study took Baghdad as a case study for the simulation experiments. The study did not include the whole country because doing such simulation work would have exponentially increased the simulation load and analyse efforts. Accordingly, for the climatic conditions of

Baghdad, four days that represent the typical conditions of summer, winter, spring and autumn were identified and used in the simulation. These four days were selected following analysing the hourly climatic conditions of Baghdad using unpublished data from the Iraqi Metrological Organization and previous literature (Bilal, Al-Jumaily, & Habbib, 2013) (Table 4. 3).

Table 4. 3. Selected simulation days' climatic conditions - Baghdad

| Season / date | Climatic conditions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Air temperature (°C) | | | | Humidity (%) | | | | Wind speed (m/s) | Direction |
| | Min. | Time | Max. | Time | Min. | Time | Max. | Time | | |
| Typical winter / 21st of January | 13.6 | 04:00 | 19.7 | 14:00 | 68.0 | 14:00 | 89.0 | 04:00 | 2.7 | East |
| Typical spring / 16th of March | 21.8 | 06:00 | 27.0 | 14:00 | 44.0 | 14:00 | 51.0 | 06:00 | 2.0 | East |
| Typical summer/ 1st of august | 31.6 | 06:00 | 46.8 | 16:00 | 26..0 | 16:00 | 41.0 | 06:00 | 1.3 | East |
| Typical autumn/ 1st of October | 27.0 | 07:00 | 38.0 | 15:00 | 39.0 | 15:00 | 63.0 | 7:00 | 2.6 | East |

In IES-VE, the research assumed a clear sky status, which is the typical status in most of the year in Iraq (Iraqi Meteorological Organization; Al-Biaty, 2018). Assigning the other climatic conditions in IES-VE was not relevant as the aim of using this software was only to determine courtyard insolation, which is not affected by climatic conditions, but changes according to the geographic location of the simulated place. The location was set to Baghdad. Regarding Envi-met, this software requires manual input of climatic conditions. This includes air temperature, humidity, air velocity, cloud coverage percentage and solar radiation. The climatic conditions of the defined four days were used as inputs for the software (Table 4. 3). The solar radiation was kept to its default calculated value by the software. It is recommended by the software guidelines not to modify this value unless the user has advanced relevant knowledge. The cloud cover was set to be ‘clear sky without clouds' to represents the typical weather conditions in Iraq, which corresponds with IES-VE the simulation. Neither rain nor dust storms have been considered in the simulation. These conditions do not represent the typical Iraqi climate, as they occur only during a short period during the year (Iraqi Meteorological Organization).

The results of the simulation experiments provided the thermal conditions of various courtyards in Baghdad during the examined four days, and the impact of the geometric properties of courtyards on their thermal conditions. The resulting dataset of simulation outputs was used to develop a regression equation that can be used to interpolate the annual hourly thermal conditions of the examined courtyards. This was required to determine CTUI and assess the thermal efficiency of courtyards.

Regarding the applicability of these results to other locations, it can be said that the relative impact of courtyard geometry on thermal conditions in courtyards is applicable to other cities in Iraq, or countries of similar climate. For instance, if a deeper courtyard in Baghdad is of a lower globe temperature, then it is of a lower globe temperature in other climatically similar places. But, the specific conditions of courtyards in Baghdad are not necessarily the same as in other cities. The reason is that thermal conditions in courtyards, as an outdoor space, are affected by the detailed outdoor climatic conditions of other places. This may lead to courtyards in other cities being colder or warmer than in Baghdad. Accordingly, the thermal comfort assessment of Baghdad may be different from other cities of different climatic conditions. To determine the range of differences and the applicability of the results of Baghdad to other cities in Iraq, the hottest and coldest courtyard options from the 360 examined courtyards were simulated in six cities in the country: Erbil, Mosul, Duhok, Ramadi, Muthana and Basrah. These two courtyards were simulated to show a clear indication of the difference between the thermal performance of courtyards in Baghdad and other cities. The considered cities in the simulation represent the whole range of climatic conditions in Iraq (Figure 4. 11). Their typical summer and typical winter climatic conditions were used in their simulation experiments (Table 4. 4).

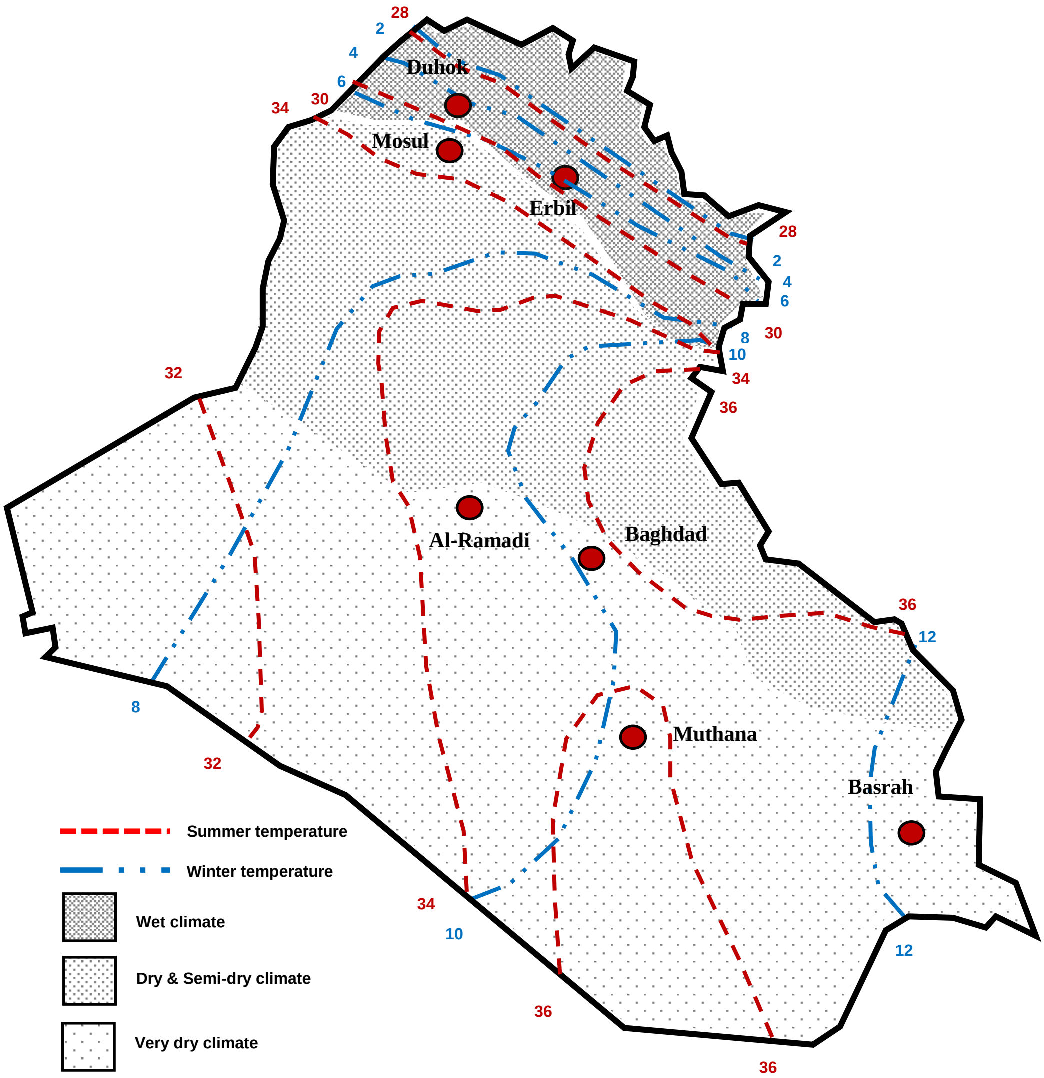



Figure 4. 11. Included cities in Envi-met simulation on a climate map of Iraq

Table 4. 4. Used climatic conditions of the simulated cities in Envi-met

| Season / date | Climatic conditions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Air temperature (°C) | | | | Humidity (%) | | | | Wind speed (m/s) | Direction |
| | Min. | Time | Max. | Time | Min. | Time | Max. | Time | | |
| **Erbil** | | | | | | | | | | |
| Typical winter / 21st of January | 3.6 | 04:00 | 14.9 | 14:00 | 42.4 | 14:00 | 98.0 | 04:00 | 0.95 | East |
| Typical summer/ 1st of August | 24.9 | 06:00 | 42 | 16:00 | 4.8 | 16:00 | 41.8 | 06:00 | 0.89 | East |
| **Duhok** | | | | | | | | | | |
| Typical winter / 21st of January | 2.5 | 04:00 | 12.5 | 14:00 | 42.4 | 14:00 | 98.0 | 04:00 | 0.95 | East |
| Typical summer/ 1st of August | 23.3 | 06:00 | 40.5 | 16:00 | 4.8 | 16:00 | 41.8 | 06:00 | 0.89 | East |
| **Mosul** | | | | | | | | | | |
| Typical winter / 21st of January | 6.7 | 04:00 | 18.9 | 14:00 | 42.4 | 14:00 | 98.0 | 04:00 | 0.95 | East |
| Typical summer/ 1st of August | 27.1 | 06:00 | 44.9 | 16:00 | 4.8 | 16:00 | 41.8 | 06:00 | 0.89 | East |
| **Muthana** | | | | | | | | | | |
| Typical winter / 21st of January | 3.0 | 04:00 | 19.3 | 14:00 | 18.6 | 14:00 | 70.1 | 04:00 | 2.3 | East |
| Typical summer/ 1st of August | 28.2 | 06:00 | 47.8 | 16:00 | 5.2 | 16:00 | 23.5 | 06:00 | 3.4 | East |
| **El-Ramadi** | | | | | | | | | | |
| Typical winter / 21st of January | 5.3 | 04:00 | 19.0 | 14:00 | 28.7 | 14:00 | 79.5 | 04:00 | 2.2 | East |
| Typical summer/ 1st of August | 26.1 | 06:00 | 43.9 | 16:00 | 5.4 | 16:00 | 30.2 | 06:00 | 4.5 | East |
| **Basrah** | | | | | | | | | | |
| Typical winter / 21st of January | 6.2 | 04:00 | 20.5 | 14:00 | 20.9 | 14:00 | 72.8 | 04:00 | 2.4 | East |
| Typical summer/ 1st of August | 29.5 | 06:00 | 49.2 | 16:00 | 4.6 | 16:00 | 42.5 | 06:00 | 2.8 | East |

## D. Simulation calibration

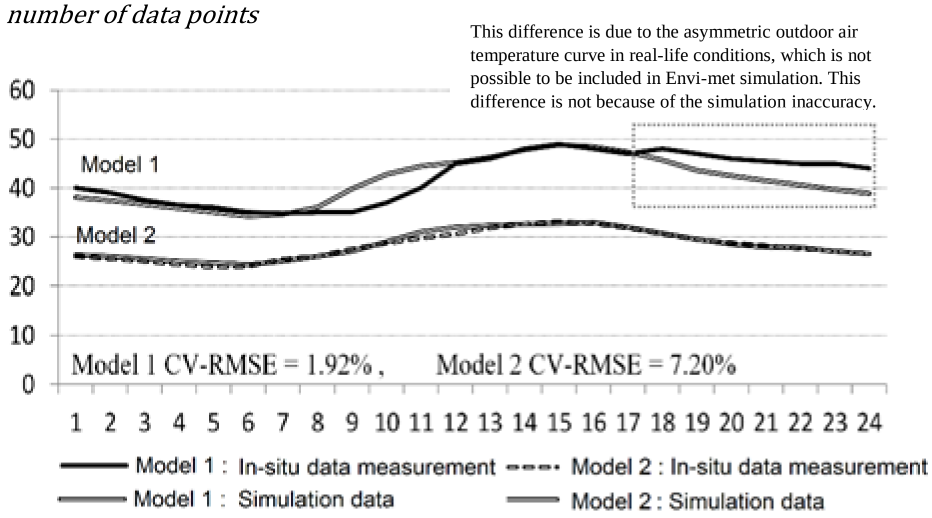
Simulation models used in this study were calibrated to ensure accurate simulation results. This was only done for the Envi-met simulation model. Regarding IES-VE, calibration was not required as its simulation is related to accurately determining the position of the sun around the year and shadow casting, which has been validated by previous studies and scientific organizations such as ASHRAE and CIBSE (Nikpour, Kandar, & Roshan, 2013; Yazhari Kermani & Javad Mahdavinejad, 2015).

Regarding Envi-met, it was essential to carry out a calibration experiment. This was for two reasons. First, the aim of the research was to determine, as accurately as possible, the actual thermal sensation of occupants in courtyards in Baghdad. Second, the results of Envi-met depend on a wide range of interrelated factors. Accordingly, for each specific context, the simulation model needs to be calibrated for accurate results. For this purpose, the simulation model was calibrated using actual measurements of two courtyard houses in Baghdad obtained from third-party measurement efforts (Al-Azzawi, 1984; Salman, 2016) (Refer to Appendix E for further details). The Baghdadi courtyard houses used for these measurements were modelled in Envi-met. The properties of courtyard surfaces were fine-tuned until the simulation results were similar to the real-life conditions. To check the validity of the calibration and the accuracy of the built simulation model, the Coefficient of Variation for the Root Mean Squared Error (CV-RMSE) statistical test was conducted. This equation gives a percentage showing the accuracy of simulation results in comparison to real-life conditions. Lower resultant values indicate a better-calibrated model (Bagneid, 2010; Haberl & Bou-Saada, 1998). The comparison showed that the simulation results agree strongly with the actual thermal measurements of both of the examined courtyards (Figure 4. 12). The maximum CV-RMSE indicates that there is only a 7.2% margin of error in the simulation data. According to the ASHRAE standard, for hourly data simulation, the simulation model can be declared to be calibrated if the result of this equation is within ± 30% (Bagneid, 2010). This research used the thermal properties of the calibrated model to ensure accurate results in simulation experiments (Table 4.5). The thermal properties used in the simulation are not claimed to be identical to the thermal properties of the actual houses; however, they lead to having similar thermal conditions in the simulation to actual houses' conditions. The thermal conditions in the calibrated simulation model combine the interaction of various effective factors in actual courtyards, including the building thermal properties, occupants' behaviours and courtyards interaction with surrounding indoor spaces.

$$CV\text{-}RMSE = ((\sum (D_a - D_d)^2 / P - 1))^{0.5} / D_{aa}$$ ----- *The validation equation*

*where:*

*$D_p$ = the predicted data, $D_a$ = the actual data, $D_{aa}$ = the average value of the actual data, P = the number of data points*




Plans have been removed due to Copyright restrictions.

Figure 4. 12. Calibrating Envi-met simulation model (Refer to Appendix E for further details)

Table 4. 5. Thermal properties used in Envi-met simulation experiments

| Thermal property | Value | Thermal property | Value |
|---|---|---|---|
| Thickness | 0.30 m | Emissivity | 1.10 Frac |
| Absorption | 0.80 Frac | Specific heat | 1300.0 J/(Kg*K) |
| Transmission | 0.00 Frac | Thermal conductivity | 0.30 W/(M*K) |
| Reflection | 0.05 Frac | Density | 1000.0 (Kg/M$^3$) |

Note: The simulation period length was set to be 32 hours, starting at 00:00. The first six hours were not considered in the results as they do not include the impact of the stored heat during the daytime on the thermal conditions of courtyards.

To further validate the simulation results, the air velocity in the simulated models was compared with in-situ data measurements from the two referenced courtyard houses. It was found that simulation results and recorded measurements are highly similar. In both cases, the air velocity in the courtyard is lower than that in the urban situations. In both cases, when the average outside air velocity is around 2.0 m/s, the air velocity in courtyards is between 0.2 and 0.3 m/s. Regarding the MRT, it was not possible to validate outcomes as there are no in-situ data measurements of MRT in actual courtyards. However, this was not considered a problem as the ability of Envi-met to simulate MRT in spaces similar to courtyards had been validated in previous studies.

This calibration approach, which involves a trial and error process, has been used in previous studies (Gusson & Duarte, 2016; Hasehzadeh Haseh, Khakzand, & Ojaghlou, 2018; Shinzato, Simon, Silva Duarte, & Bruse, 2019). Other approaches, such as the optimization-based calibration can lead to more accurate simulation models. However, it was not a feasible option for this study due to the complexity of the climatic conditions in urban contexts and the long and time-consuming process (Maleki, Kiesel, Vuckovic, & Mahdavi, 2014).

E. Analysis approach

The data obtained from Envi-met and IES-VE were arranged in Excel sheets. IBM SPSS statistics 24 package was used to analyse the correlations between the various explored variables. The analysis included conducting regression analyses. There were two aims from doing the analysis. The first aim was to determine the impact of courtyard geometry on resulting thermal conditions in order to indicate approaches that can help to manipulate the thermal conditions in courtyards. The second aim was to develop equations that can be used to predict thermal conditions in contexts not simulated by this study but of similar climatic conditions.

## 4.4. Summary of chapter four

This chapter presents the research methodology adopted in this thesis to assess the thermal comfort extent in courtyards in Iraq. This research developed the Courtyard Thermal Usability Index (CTUI). This index assesses the thermal comfort level in courtyards through determining the amount of time a courtyard offers a thermally comfortable environment to occupants, to use for domestic activities. The research determined the thermal comfort limits of Iraqis and possible thermal conditions of courtyards. For the former, the research conducted a thermal comfort survey. The survey included measuring thermal conditions and recording thermal votes by ninety participants in four cities in Iraq for a year. Then, results were correlated with outdoor conditions to develop an adaptive thermal comfort for residential spaces for Iraq. Regarding the thermal conditions of courtyards, this research used Envi-met and IES-VE to conduct a set of simulation experiments to determine the thermal conditions of 360 different courtyards. The research used the results of the simulation and the survey to determine CTUI of each of the 360 examined courtyards. The research determined the annual thermally comfortable hours for all of the examined courtyards. Then, it analysed results and ranked courtyards to draw conclusions regarding the possible range of thermal comfort in courtyards in Iraq. To determine the ability of the courtyard space to improve the thermal conditions of buildings, the research compared the thermal conditions of courtyards with the thermal conditions of a typical street space in Baghdad. This comparison was based on that courtyard buildings interact with outdoor conditions through their courtyards, while non-courtyard buildings interact with outdoor conditions through surrounding street spaces. Accordingly, if the courtyard space offers a more thermally comfortable environment than the street space, then the courtyard space is considered thermally efficient and may help to improve the thermal conditions of buildings as indoor spaces will be interacting with mitigated climatic conditions.

# Chapter Five ….. Assessing thermal efficiency of courtyards

# Chapter 5 – Results: Assessing thermal efficiency of courtyards

This research conducted a thermal comfort survey and a set of simulation experiments to determine the thermal comfort limits of Iraqis, and the thermal conditions of courtyards in Iraq. Based on the results of the survey and the simulation, the research determined the level of thermal comfort courtyards may offer to occupants in the country using the developed Courtyard Thermal Usability Index (CTUI). This chapter presents the results of this research work. The chapter is divided into three sections:

- The first section presents the results of the thermal comfort survey and proposes an adaptive thermal comfort model for residential buildings in Iraq.
- The second section presents the results of the simulation experiments, which include exploring the impact of the geometric properties of courtyards on their thermal conditions.
- The third section presents the assessment of the thermal efficiency of courtyards through determining CTUIs of different courtyard configurations and making a comparison with typical street spaces.

This chapter ends with a discussion of the results, highlighting the potential thermally efficiency of courtyards, and identifying the limitations of the thermal performance of courtyards. Based on the results of the study, the chapter presents two design examples of courtyard multi-family buildings to illustrate the possibility of using thermally efficient courtyards in multi-family buildings. Simulation efforts to assess the thermal efficiency of these two design examples are included.

## 5.1. Iraqis thermal comfort limits: results of the comfort survey

A thermal comfort survey was conducted in Iraq from October 2017 to October 2018, in which participants were asked to record their thermal comfort votes and the thermal conditions of their residential environments. The survey aimed to collect data from different Iraqi cities to develop an adaptive thermal comfort model for residential buildings that can be used to determine the thermal comfort limits of Iraqis.

### 5.1.1. Survey participants

Ninety people participated in the survey from four cities: Baghdad, Mosul, Erbil and El-Ramadi. Seventy three of the participants recorded their votes regularly on a weekly basis over the survey period. The rest of the participants were not regular participants, but guests who occasionally visited the survey host households during the survey period. The total number of the recorded comfort votes is 6467. They were 2776 votes from Erbil, 1862 votes from Mosul, 1563 votes from Baghdad, and only 266 votes from El-Ramadi (Figure 5. 1). The results of El-Ramadi were not analysed separately due to the low number of collected votes. These numbers of participants and recorded votes exceed the recommended threshold by Nicol et al., 2012 to have a representative sample, which is twenty participants giving 2000 votes. However, 321 votes were not considered in the analysis because of being improperly recorded, which included, mainly, the following two cases of votes:

- Thermal comfort votes that missed thermal measurements, as this prevents determining the correlation between the thermal sensation of participants and the thermal conditions of their environments.

- Thermal comfort votes that were taken simultaneously for the same participants in indoor and outdoor spaces. This is due to two reasons. First, the measurement instrument being used requires a time gap when moving between spaces to ensure correct measurements. Second, people need to accommodate to their environments for them to be able to give accurate thermal votes (Salata et al, 2016). In the survey's information sheet, participants were asked to allow at least a thirty minutes gap when moving between environments.

The resulting total number of the considered votes was 6146. They were 2643 votes in indoor spaces in the mode of natural ventilation, 2154 in indoor spaces in the mode of air-conditioning, and 1349 in outdoor spaces.

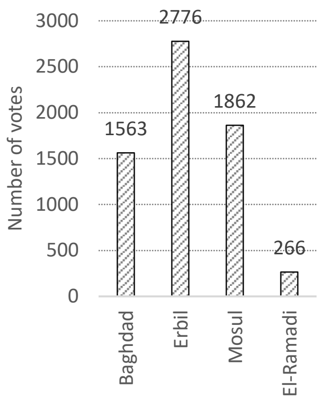



Figure 5.1.A. Number of collected votes for each of the surveyed cities

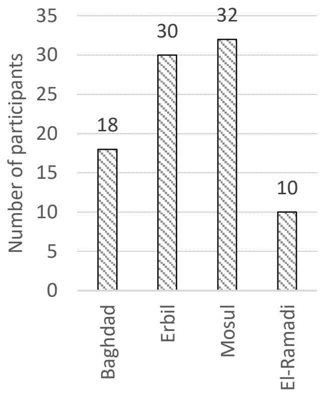



Figure 5.1.B. Number of participants

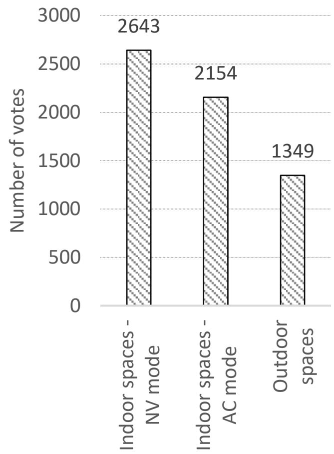



Figure 5.1.C. Number of considered votes for each typology of spaces

Figure 5. 1. Number of participants and recorded thermal comfort votes in the comfort survey

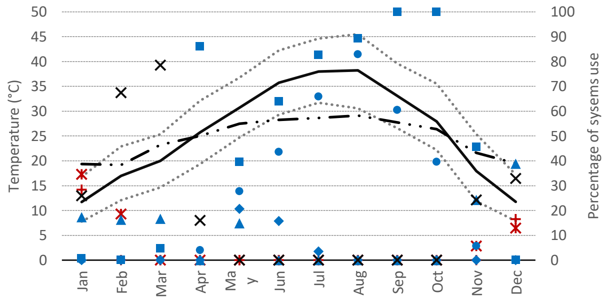
### 5.1.2. Survey results

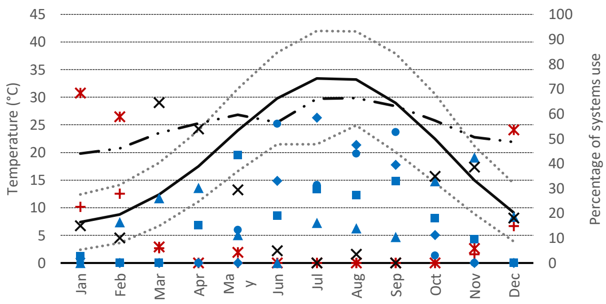
A. Indoor temperature and the use of heating and cooling systems.

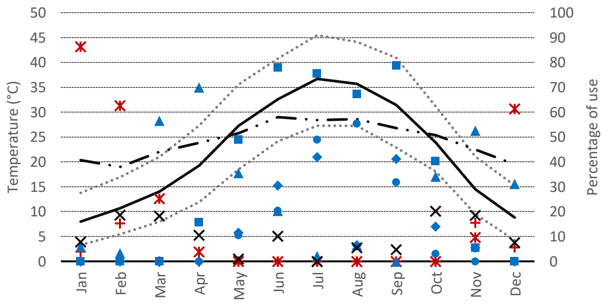
In the thermal comfort survey, participants recorded the thermal conditions of their spaces and the use of air-conditioning systems. The results show that the indoor globe temperature in all cases ranged between 20°C and 30°C, although there was a difference of around 5°C at some points in the outdoor air temperature between the surveyed cities. The first three graphs in Table 5. 1 show the indoor and outdoor conditions and the percentage of use of various cooling and heating systems in Baghdad, Erbil and Mosul. The last graph in (Table 5. 1) shows the overall cooling and heating periods in all of the surveyed houses. It can be seen that the heating period is from November to April. The cooling period is from March to December. Within the cold period, people, occasionally, did not use heating systems and closing their windows was seen as sufficient. The peak use of heating systems was in January, and the peak use of cooling systems was in July. The period in which participants mostly used neither cooling nor heating systems was in March. It can be seen that the cooling period was longer and had more intensive use of air-conditioning systems in comparison to the heating period. The heating systems used included air-conditioning units and heaters. The cooling systems used included air-conditioning units, evaporative coolers and fans. The use of these systems enabled the participants to make a difference of up to 16°C comparing to outdoor temperature (Figure 5.2).

Table 5. 1. Indoor thermal conditions - (Refer to Appendix G for further details)

| Month | AC-H | H | AC-C | Co | F | W | N |
|---|---|---|---|---|---|---|---|
| | Heating and cooling systems usage (percentage) | | | | | | |
| | Baghdad's conditions and use of cooling and heating systems | | | | | | |
| Jan | 28 | 35 | 0 | 0 | 1 | 17 | 26 |
| Feb | 0 | 19 | 0 | 0 | 0 | 16 | 67 |
| Mar | 0 | 0 | 0 | 0 | 5 | 17 | 79 |
| Apr | 0 | 0 | 4 | 0 | 86 | 0 | 16 |
| May | 0 | 0 | 28 | 21 | 40 | 15 | 0 |
| Jun | 0 | 0 | 44 | 16 | 64 | 0 | 0 |
| Jul | 0 | 0 | 66 | 3 | 83 | 0 | 0 |
| Aug | 0 | 0 | 83 | 0 | 89 | 0 | 0 |
| Sep | 0 | 0 | 60 | 0 | 100 | 0 | 0 |
| Oct | 0 | 0 | 40 | 0 | 100 | 0 | 0 |
| Nov | 0 | 6 | 6 | 0 | 46 | 24 | 24 |
| Dec | 16 | 13 | 0 | 0 | 0 | 39 | 33 |
| | Erbil's conditions and use of cooling and heating systems | | | | | | |
| Jan | 23 | 68 | 0 | 2 | 3 | 0 | 15 |
| Feb | 28 | 59 | 0 | 0 | 0 | 16 | 10 |
| Mar | 6 | 7 | 0 | 0 | 0 | 26 | 64 |
| Apr | 0 | 0 | 0 | 0 | 15 | 30 | 54 |
| May | 0 | 4 | 13 | 0 | 43 | 11 | 29 |
| Jun | 0 | 0 | 56 | 33 | 19 | 0 | 5 |
| Jul | 0 | 0 | 31 | 58 | 30 | 16 | 0 |
| Aug | 0 | 0 | 44 | 48 | 27 | 14 | 3 |
| Sep | 0 | 0 | 53 | 39 | 33 | 11 | 0 |
| Oct | 0 | 0 | 3 | 11 | 18 | 33 | 35 |
| Nov | 3 | 6 | 0 | 0 | 10 | 42 | 39 |
| Dec | 15 | 53 | 0 | 0 | 0 | 19 | 18 |
| | Mosul's conditions and use of cooling and heating systems | | | | | | |
| Jan | 4 | 86 | 0 | 0 | 0 | 6 | 8 |
| Feb | 15 | 63 | 0 | 0 | 0 | 3 | 19 |
| Mar | 0 | 25 | 0 | 0 | 0 | 57 | 18 |
| Apr | 0 | 4 | 0 | 0 | 16 | 70 | 11 |
| May | 0 | 0 | 11 | 12 | 49 | 36 | 1 |
| Jun | 0 | 0 | 20 | 31 | 78 | 20 | 10 |
| Jul | 0 | 0 | 49 | 42 | 76 | 2 | 0 |
| Aug | 0 | 0 | 55 | 7 | 67 | 7 | 5 |
| Sep | 0 | 0 | 32 | 41 | 79 | 0 | 5 |
| Oct | 0 | 0 | 3 | 14 | 40 | 34 | 20 |
| Nov | 16 | 10 | 0 | 5 | 5 | 53 | 18 |
| Dec | 6 | 61 | 0 | 0 | 0 | 31 | 8 |

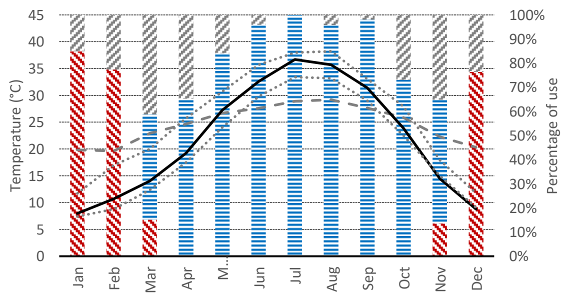



Average of all cities' conditions and cooling/heating periods

| Month | Baghdad Tg | Erbil Tg | Mosul Tg | All Average. Tg |
|---|---|---|---|---|
| Jan | 19.3 | 19.8 | 20.3 | 19.3 |
| Feb | 19.1 | 20.7 | 18.9 | 19.1 |
| Mar | 23.2 | 23.5 | 22.0 | 23.2 |
| Apr | 25.0 | 25.2 | 23.8 | 25.0 |
| May | 27.4 | 26.8 | 25.7 | 27.4 |
| Jun | 28.2 | 25.4 | 29.0 | 28.2 |
| Jul | 28.6 | 29.7 | 28.4 | 28.6 |
| Aug | 29.1 | 29.8 | 28.6 | 29.1 |
| Sep | 27.7 | 28.4 | 26.8 | 27.7 |
| Oct | 26.3 | 25.8 | 25.4 | 26.3 |
| Nov | 21.6 | 22.7 | 22.4 | 21.6 |
| Dec | 19.5 | 21.9 | 19.5 | 19.5 |




Key

Max. outside Ta; Min. outside Ta; Mean outside Ta; Mean inside Tg

Air conditioning -Heating; Heater; Air conditioning -Cooling

Cooler; Fan; Natural ventilation (open window); No heating/cooling used

No Cooling/Heating; Cooling system; Heating system

**AC-H**:Air Conditioning – Heating; **H**:Heater; **AC-C**:Air Conditioning – Cooling; **Co**:Cooler; **F**: Fan; **W**: open window; **N**:No heating / cooling used; **Ta**: Air temp.; **Tg**:Globe temp.

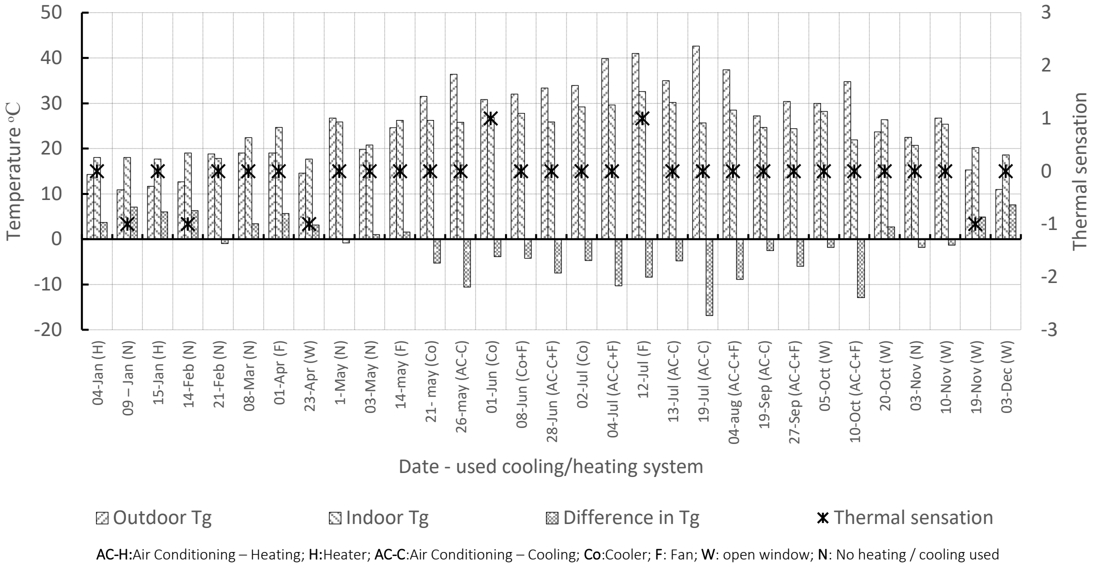
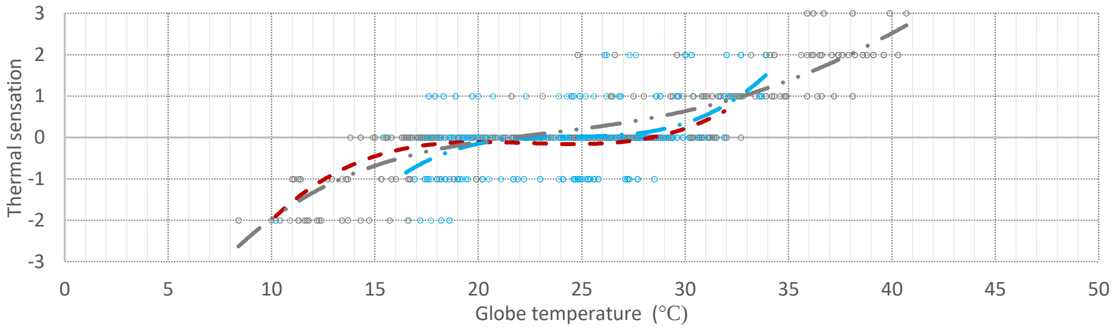



Figure 5. 2. Impact of the used cooling and heating systems on indoor temperature

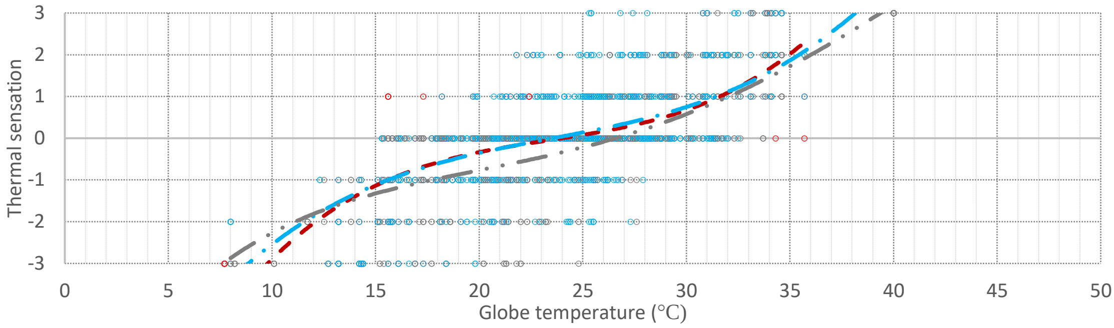
## B. Comfortable globe temperature

Following the exploration of indoor conditions and the use of heating and cooling systems, the correlation between the recorded thermal sensation of participants and globe temperature was analysed. The aim of this analysis was to explore the overall thermal comfort range for each of the examined cities and the variations between them, which is essential when developing an adaptive thermal comfort model for the country. In the analysis, outliers were found. These outliers were managed to ensure clean data. Three approaches were used when dealing with outliers: correction of wrong input data, capping of extraordinarily high or low values, or removal from the dataset if they seemed abnormal in comparison to the whole dataset.

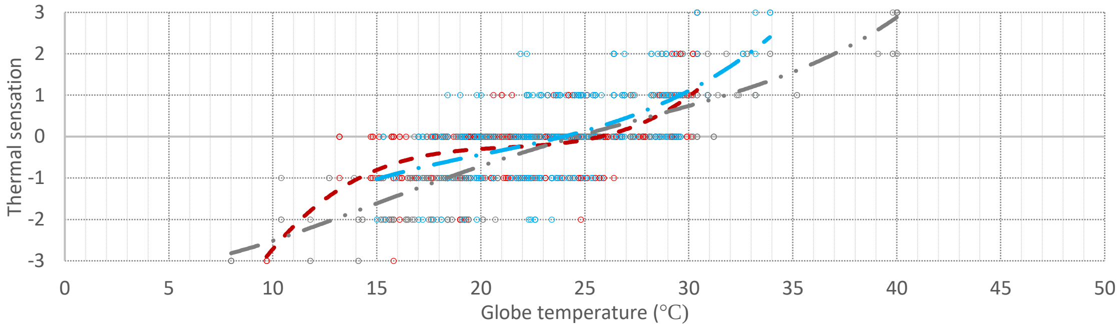
The results analysis showed that the correlation between the thermal sensation of participants and globe temperature is not linear, but rather polynomial (Figure 5. 3). Overall, without making correlation with the outdoor temperature, participants feel comfortable when the globe temperature is between 14.0°C and 32.0°C. However, their thermal sensation changes dramatically to hot or cold above or below these comfort limits.



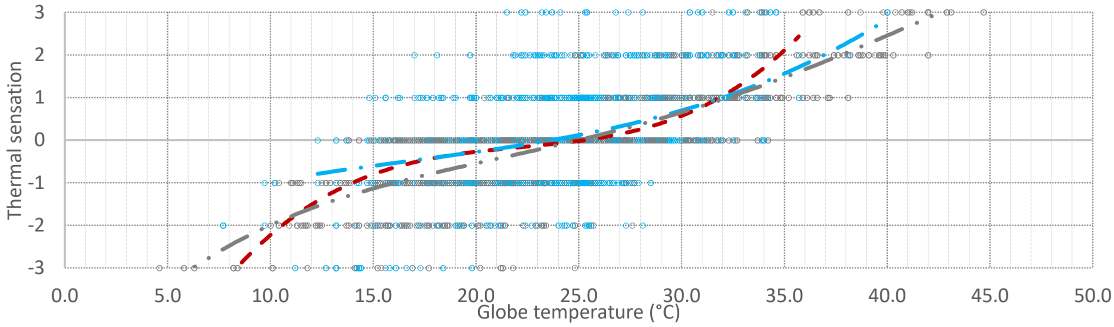

5.3.A. Occupants' thermal sensation and globe temperature in Baghdad




5.3.B. Occupants' thermal sensation and globe temperature in Erbil




5.3.C. Occupants thermal sensation and globe temperature in Mosul




5.3.D Overall occupants' thermal sensation and globe temperature

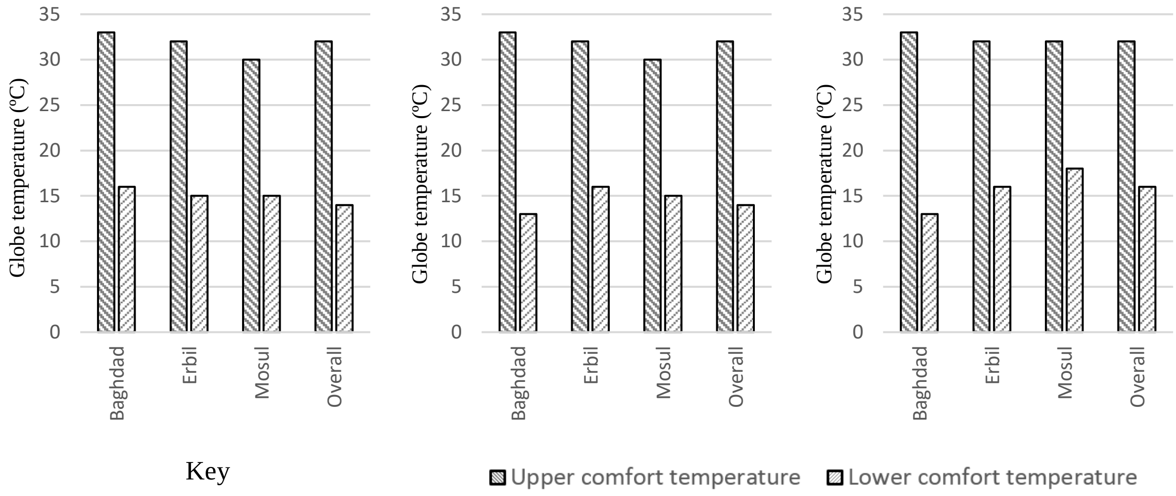
Key Outdoor space Indoor space – AC mode Indoor space – NV mode

Figure 5. 3. Correlations between participants' thermal sensation and globe temperature (Refer to Appendix G for further details)

Looking at the differences in the thermal sensation of participants between Baghdad, Erbil and Mosul shows that comfort limits in these three cities are close to each other (Table 5. 2) (Figure 5. 4). In the majority of cases, results are identical or show only 2°C to 3°C difference. The highest recorded difference is 5°C, which can be seen in the lower comfort limit in outdoor spaces between Baghdad and Mosul. The lower comfort globe temperature is 13°C in Baghdad and 18°C in Mosul. However, these differences cannot be attributed strictly to the differences in the climatic conditions of these cities. The reason is that the difference between the contextual air temperatures in the three surveyed cities is limited. The highest difference in the running mean outdoor air temperature is between Baghdad and Mosul, which is 1.7 °C. This difference in the contextual temperature does not justify having a 5°C difference in comfort limits between these two cities. Accordingly, the differences between the comfort limits are attributed to the thermal preferences of participants, not to the climatic differences between cities.

Table 5. 2. Comfort limits and contextual air temperature in surveyed cities (see graphs in Figure 5. 3)

| City | Globe temperature comfort limits (°C) | | | | | | Contextual air temperature | |
|---|---|---|---|---|---|---|---|---|
| | Indoor spaces NV mode | | Indoor spaces AC mode | | Outdoor spaces | | Min. outdoor running mean air temperature | Max. outdoor running mean air temperature |
| | Min | Max | Min | Max | Min | Max | | |
| Baghdad | 16 | 33 | 13 | 33 | 13 | 33 | 9.4 | 37.5 |
| Erbil | 15 | 32 | 16 | 32 | 16 | 32 | 7.8 | 38.7 |
| Mosul | 15 | 30 | 15 | 30 | 18 | 32 | 7.7 | 37.6 |
| Overall | 14 | 32 | 14 | 32 | 16 | 32 | | |




Indoor spaces – NV mode Indoor spaces – AC mode Outdoor spaces

Figure 5. 4. Thermal comfort variations (Baghdad - Erbil -Mosul)

As results show a high level of similarity between thermal comfort limits in the surveyed cities and in indoor and outdoor spaces, the whole dataset was used to develop an overall adaptive thermal comfort model for Iraq. This approach may seem to be contradicting thermal comfort studies that suggest that thermal comfort limits are different between indoor and outdoor spaces, especially if indoor spaces are air-conditioned (Brager & de Dear, 2001). However, in the case of the current study, it is reasonable to combine data into one model for two reasons. First, the surveyed spaces are all mixed-mode ventilation ones. In other words, they are naturally ventilated at some points. Studies indicate that thermal comfort in outdoor spaces is similar to naturally ventilated indoor spaces as both typologies of spaces are exposed to the same dynamic thermal conditions (Kato & Hiyama, 2012; W. Yang, Wong, & Jusuf, 2013). The second reason, which may not be applicable to other countries, is the electricity supply interruptions in Iraq that prevent continuous use of air-conditioning systems and lead to having the thermal conditions of indoor spaces similar to outside conditions (Rashid et al., 2018). This situation makes people ready to accept a wider range of temperatures than if they can always significantly control the thermal conditions of their environments (Table 5. 2) (Brager & de Dear, 2001). These two reasons justify having thermal comfort limits recorded by participants of high similarity in indoor and outdoor spaces.

### 5.1.3. Adaptive thermal comfort model for Iraq

To develop an overall adaptive thermal comfort model for Iraq, the running mean outdoor air temperatures of Baghdad, Erbil and Mosul were calculated. Then, an annual overall running mean outdoor air temperature rates for all of the three cities were calculated to represent the thermal conditions of the whole country. Finally, a regression analysis was done using IBM SPSS Statistics 24 package to correlate the overall running mean outdoor air temperature with the recorded globe temperature and thermal votes by the participants in the survey. Figure 5. 5 shows the resulting adaptive thermal comfort model. With 90% confidence level, the graph shows that during winter, when the running mean outdoor air temperature is 8.0°C, the comfortable globe temperature is 14.0 – 24.0°C. In summer, when the running mean outdoor air temperature is 38.0°C, the comfort range of globe temperature is 25.0 – 35.0 °C. The perfect lower and upper comfort limits are 19°C and 30°C when the outdoor running mean air temperature is 8°C and 38°C, respectively. A narrower comfort range for a higher confidence level is the one defined by the regression lines of the +1 and -1 thermal sensation votes. According to this comfort range, the lowest comfortable globe temperature during the coldest time in winter is 17.0°C and the highest acceptable globe temperature during the hottest time in summer is 33.0°C.

This adaptive thermal comfort model is to be used for the assessment of indoor and private outdoor residential spaces in Iraq. It is essential to consider that the southern cities of the country were not included in the conducted thermal comfort survey. However, this may not affect the applicability of the model to these cities, as there is no significant climatic difference between these cities and the surveyed cities. The typical maximum air temperature in summer in the cities not surveyed is around 2.0°C higher than Baghdad. Their typical minimum air temperature in winter is similar to the surveyed cities (Iraqi Meteorological organization 2016).

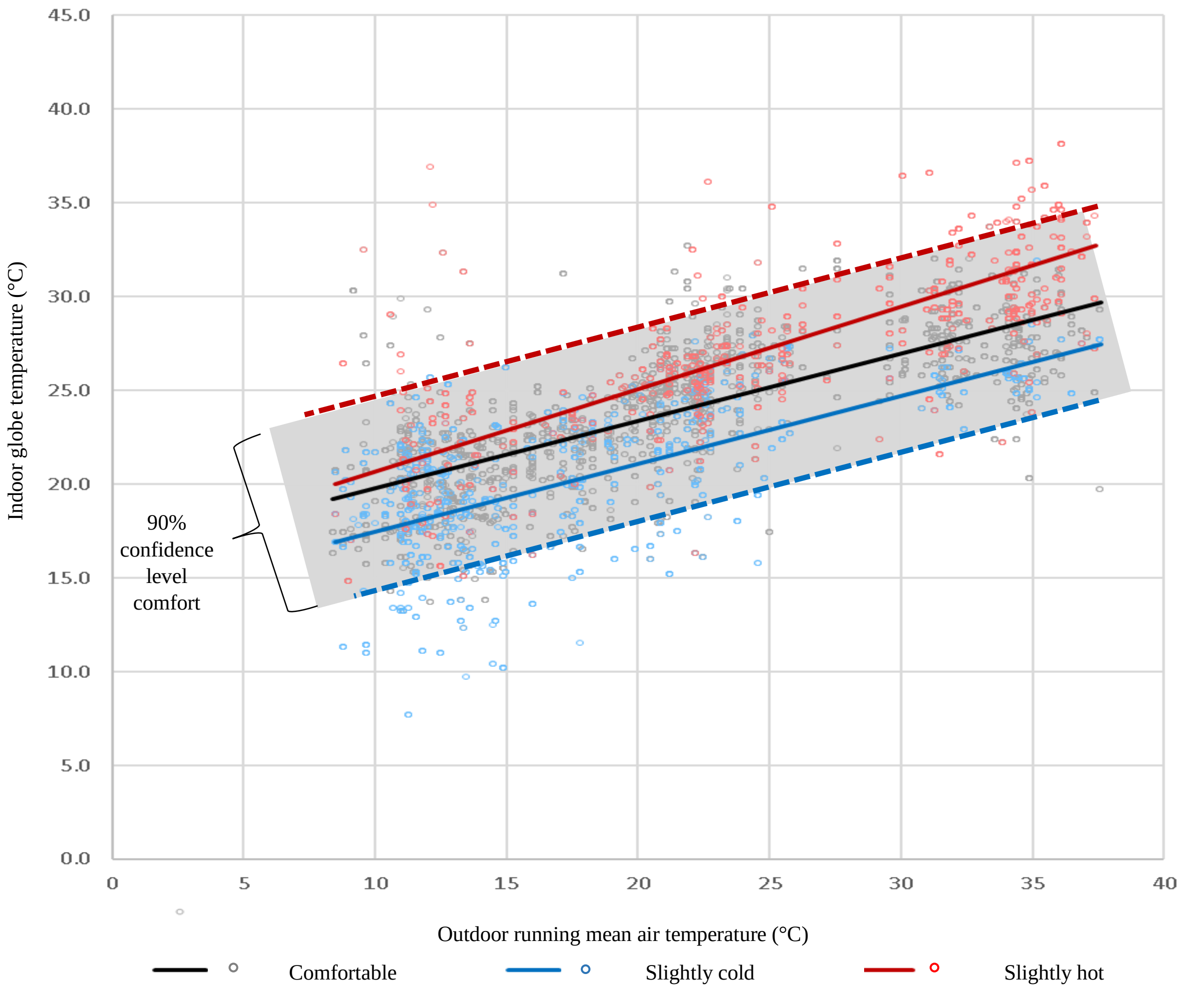



Figure 5. 5. The adaptive thermal comfort model for Iraq

(Refer to Appendix G for further details)

## 5.2. Courtyards thermal conditions in Iraq: simulation results

Envi-met and IES-VE were used to simulate the thermal conditions of 360 different courtyard configurations in Iraq. The simulation was done for Baghdad for four days representing the annual thermal conditions in the country. A regression equation was developed from the simulation results interpolating the hourly annual thermal conditions of courtyards in Baghdad. Simulation experiments of two courtyards were done for six cities in Iraq to determine the applicability of the results of Baghdad to the rest of the country. The globe temperature was used as a thermal index to assess the thermal sensation of occupants. The globe temperature was determined from simulation outputs and using the equation from literature (Moss, 2015).

$$Tg= (MRT + 2.35 \times Ta \times (Av)^{0.5})/ (1 + 2.35 \times (Av)^{0.5})$$

This section presents the results of the conducted simulation experiments. It demonstrates the impact of courtyard geometry on its insolation, air temperature, MRT, air velocity and globe temperature. Furthermore, this section presents the practical implications of the impact of courtyard geometry on each of these climatic factors which need to be considered by architects and designers when designing future courtyard spaces.

### 5.2.1. Courtyards insolation

A. Impact of courtyard geometry on insolation level

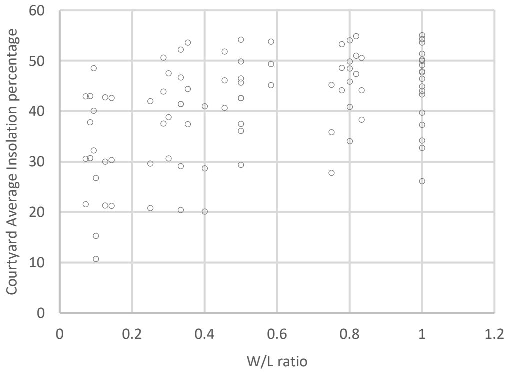
Results show that changing the courtyard geometry affects the insolation level of the courtyard space. Table 5.3 shows that all of the examined geometric properties and orientation have a statistically significant impact on courtyard insolation (P-Value < 0.05). As the Pearson coefficient shows, the W/H ratio has the most substantial impact on the insolation level. The orientation has the least impact on the insolation level. Figure 5. 6 shows four graphs elaborating on the impact of changing the ratios of W/L, W/H and P/H and orientation on the insolation level. In these graphs, it can be seen that W/L ratio and the courtyard orientation do not have a substantial impact on the insolation level (Figure 5.6.E). Figures 5.6.A and 5.6.D show randomly scattered data indicating the correlation between W/L ratio and the orientation, on one side, and the insolation level, on the other side. In other words, figures 5.6.A and 5.6.D and the statistical analysis in Table 5.3 show that the orientation and rectangularity of the courtyard plan are of limited impact on the insolation level in courtyards. However, this is not the case with W/H and P/H ratios. There is a strong positive correlation between the W/H and P/H ratios and the insolation level of courtyards (5.6.B; 5.6.C). This relationship is positive and polynomial. The strength of the impacts of changing these two ratios on insolation decrease above the W/H of 1.0 and P/H of 10.0 comparing to their impacts below these ratios. The W/H ratio becomes insignificant for the insolation level above the ratio of 2:1.

B. Practical implications

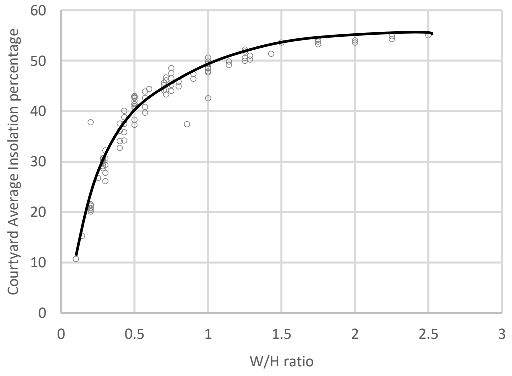
In practice, these results show that the main geometric property that needs to be considered by architects and designers to manipulate shading in courtyards is the relation between their height to their width and periphery. The higher W/H and P/H ratios lead to higher insolation level. Expressed in a different way, the shallower the courtyard, the higher insolation level. The rectangularity (W/H) and orientation of the courtyard plan are of limited impact on the insolation level.

Table 5. 3. Correlation analysis between the courtyard geometry and its insolation

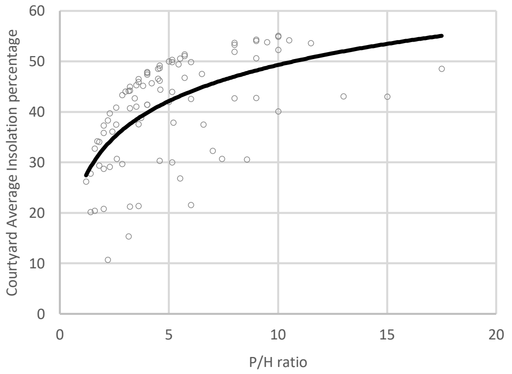
| | W/L | W/H | P/H | Orientation |
|---|---|---|---|---|
| Pearson coefficient | 0.074 | 0.231 | 0.168 | 0.011 |
| Sig. (P-value) | 0.00 | 0.00 | 0.00 | 0.00 |



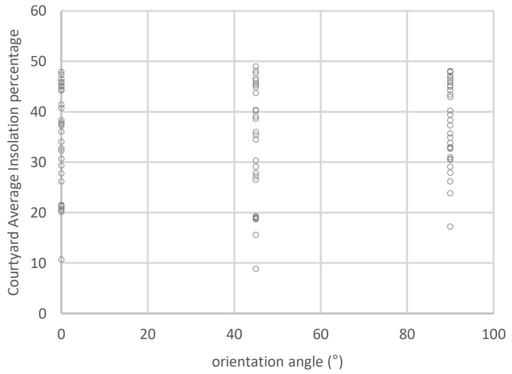

5.6. A. The correlation between the Width/Length (W/L) ratio and courtyard insolation



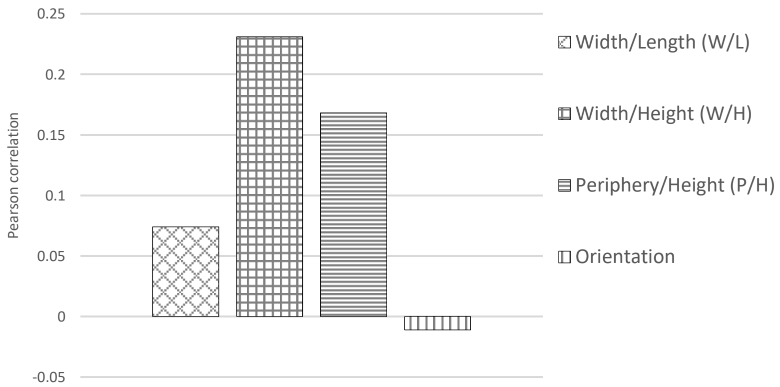

5.6. B. The correlation between the Width/Height (W/H) ratio and courtyard insolation




5.6. C. The correlation between the Periphery/Height (P/H) ratio and courtyard insolation




5.6. D. The correlation between the orientation and courtyard insolation




5.6.E. Strength of impact of each of the geometric properties on courtyard insolation

Figure 5. 6. Impact of courtyard geometry on insolation
All of the presented data are for summer at 12:00 PM– same correlation is applied to other times and other seasons. (Refer to Appendix F for further details)

### 5.2.2. Courtyards air temperature

A. Impact of courtyard geometry on air temperature

Results indicate that the geometric properties of courtyards have limited or no impact on air temperature in courtyards. Graphical representations of Envi-met simulation results show that the variation range within courtyards and between the various courtyard forms does not exceed 0.5 ºC (Figure 5. 7). The correlation analysis shows that none of the courtyard geometric variables has a statistically significant correlation with air temperature (P-value > 0.05), except the W/H ratio, which is of a limited impact (Pearson coefficient = 0.027) (Table 5. 4). The graphs in (Figure 5. 8) show scattered data that does not indicate an order of impact of all of the geometric variables on air temperature in courtyards.

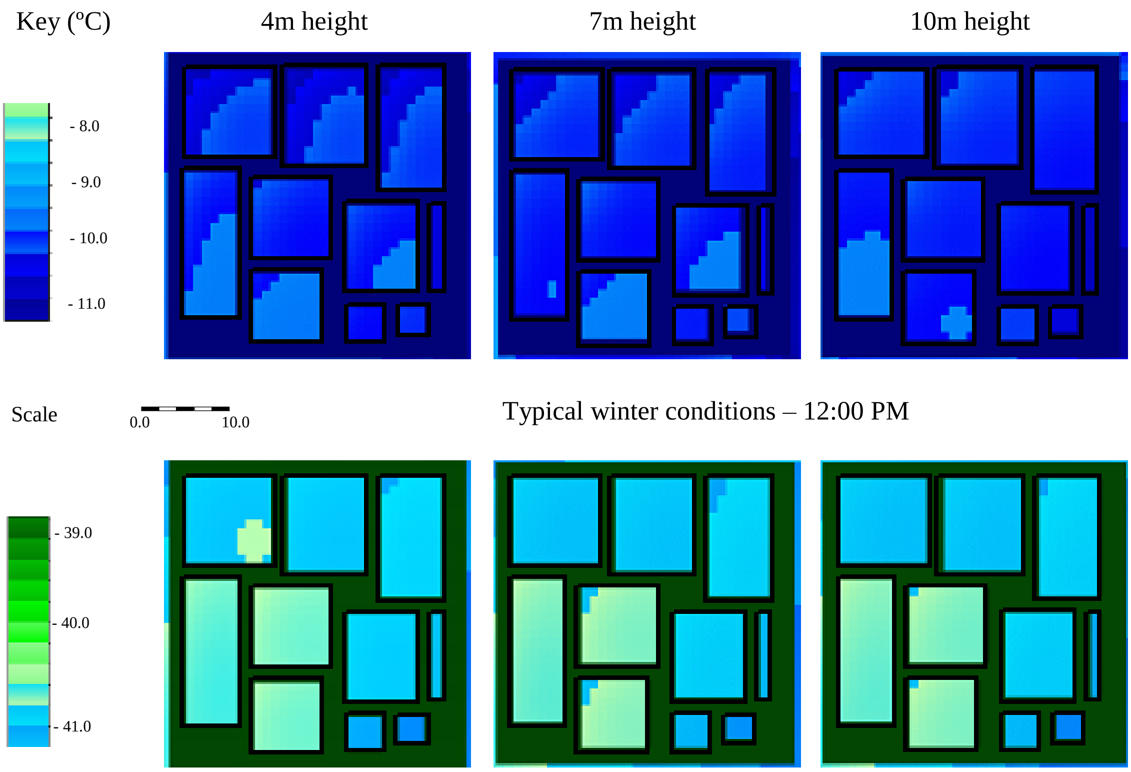



Figure 5. 7. Graphical representations of Envi-met simulation - air temperature

B. Practical implications

These results indicate that architects and designers cannot manipulate air temperature in courtyards by working on their geometric properties. Accordingly, the air temperature should not be considered as a controllable variable when assessing and managing the thermal impact of the geometric properties of courtyards. Where the aim is to have a level of control over the air temperature in courtyards, this needs to be done through approaches other than manipulating the geometric properties of courtyards, which may include using thermal mass, evaporation, or mechanical heating and cooling systems.

Table 5. 4. Correlation between the courtyard geometry and air temperature

| | Courtyard area | Courtyard orientation | W/L | W/H | P/H |
|---|---|---|---|---|---|
| Pearson coefficient | 0.009 | 0.007 | 0.018 | 0.027 | 0.017 |
| Sig. (P-value) | 0.350 | 0.475 | 0.063 | 0.005 | 0.085 |

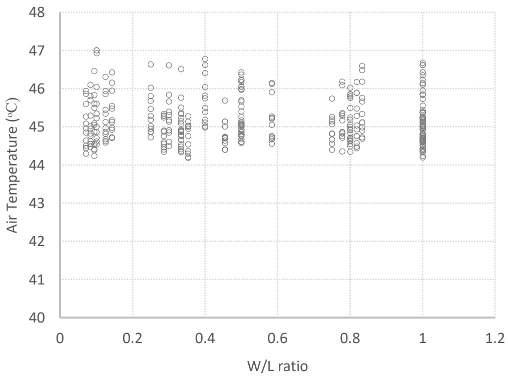



Figure 5.8.A.The correlation between the Width/Length (W/L) ratio and air temperature

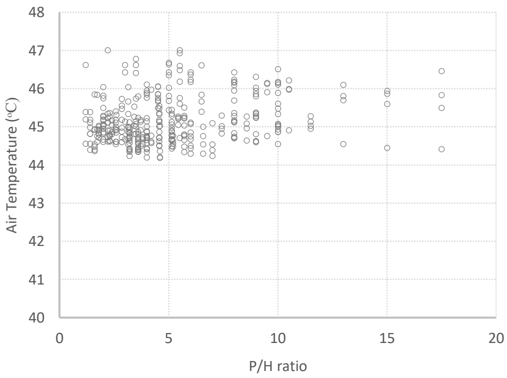



Figure 5.8.B. The correlation between the Periphery/Height (P/H) ratio and air temperature

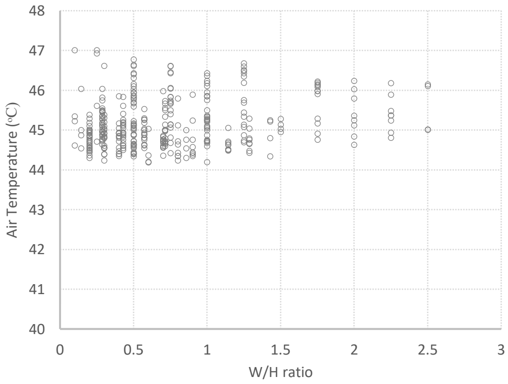



Figure 5.8.C. The correlation between the Width/Height (W/H) ratio and air temperature

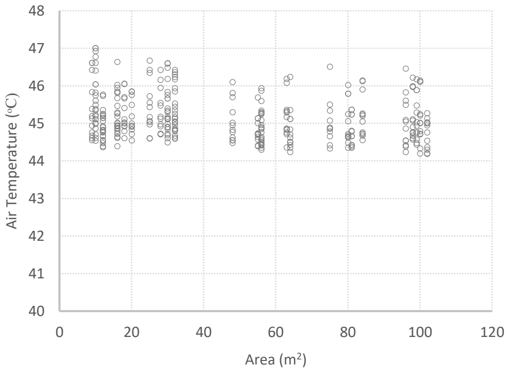



Figure 5.8.D. The correlation between the courtyards area and air temperature

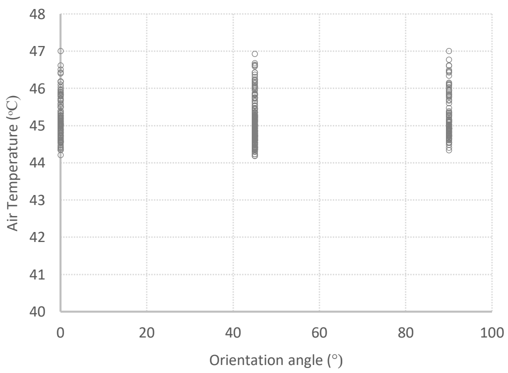



Figure 5.8.E. The correlation between the orientation and air temperature

Figure 5. 8. Impact of courtyard geometry on air temperature
All of the presented data is for summer at 12:00 PM- same correlation is applied to other times and other seasons. (Refer to Appendix F for further details)

### 5.2.3. Courtyards MRT

A. Impact of courtyard geometry on MRT

As this is affected by the insolation level, MRT is influenced by the geometric properties of courtyards. Graphical representations of Envi-met simulation show that the difference in MRT between shaded and sunlit areas in courtyards can be up to 15.0 ºC (Figure 5. 9). There is a significant correlation between courtyard geometry and MRT (P-Value < 0.05) (Table 5.5). As with the insolation case, the relationship between MRT and the geometric ratios is polynomial. MRT increases by increasing W/H ratio up to 2.1. Above this value, there is no or limited impact on the insolation level, and MRT is stable at its highest possible level (Figure 5.10.B). W/H and P/H ratios have the highest impacts on MRT (Figure 5. 10.F). Regarding the impact of the courtyard area, affected by the insolation level, MRT is higher in large courtyards than small courtyards (Figure 5.9; Figure 5.10.D). The orientation and the W/L ratio are of limited impacts on MRT (Figure 5.10.A; 5.10.E).

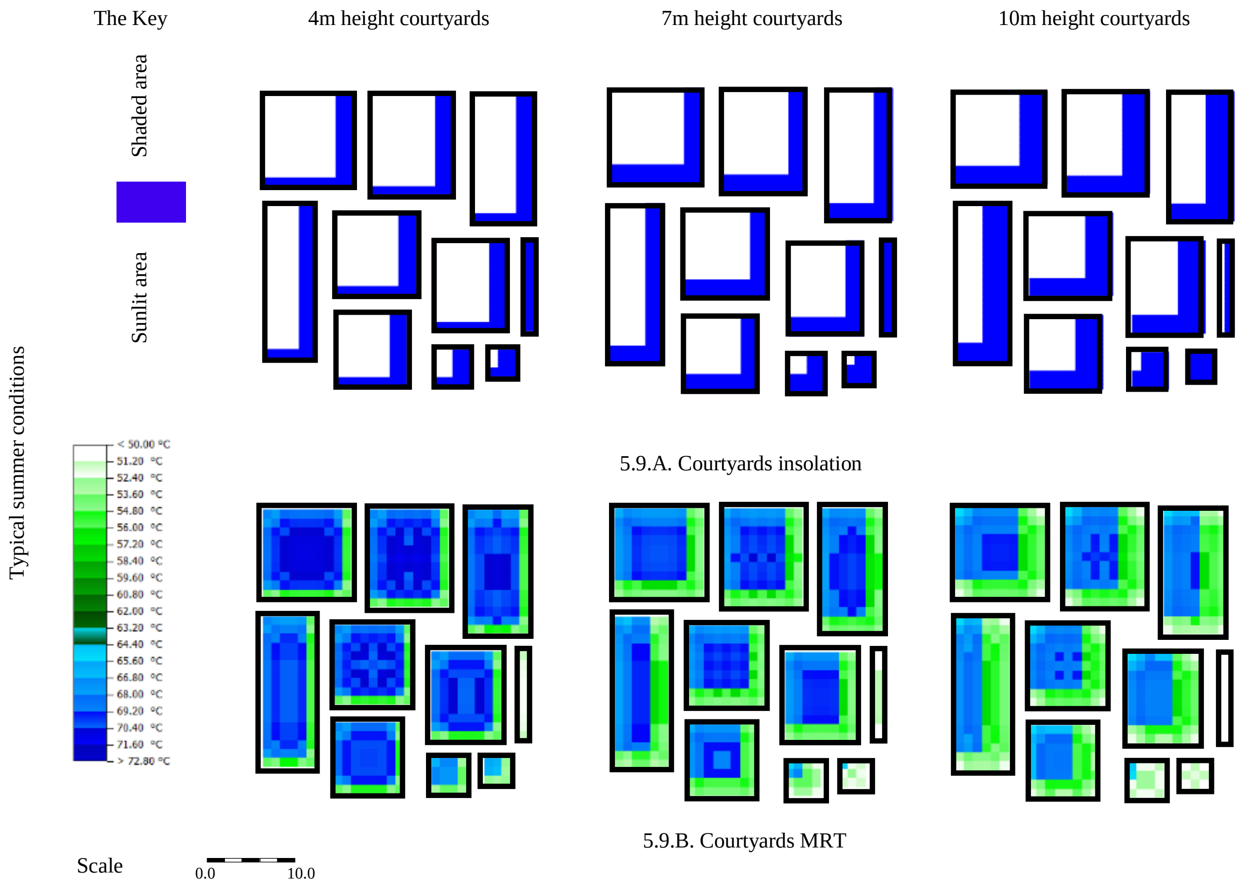


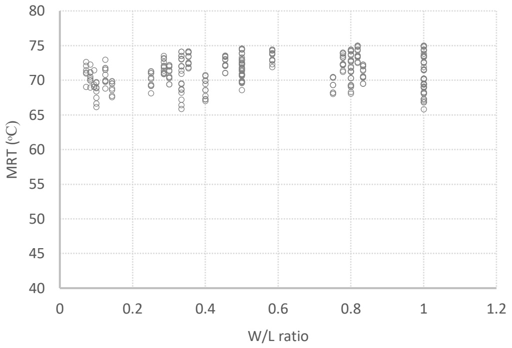

Figure 5. 9. MRT and insolation in thirty courtyards during summer at 12:00 PM

B. Practical implications

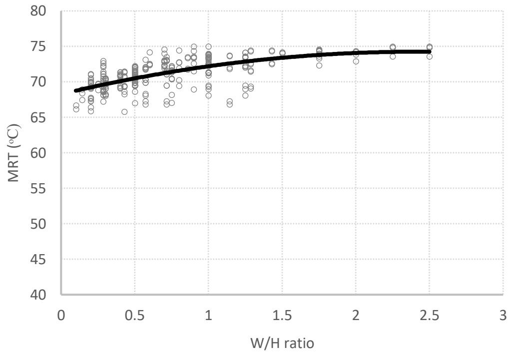
Based on these results, architects and designers can manipulate MRT in courtyards by working on their insolation levels, which can be done by manipulating the geometric properties of courtyards. The most effective factor that needs to be considered, as with the insolation case, is the height of the courtyard space in relation to its width and periphery. The W/L ratio and orientation do not have a significant impact on MRT.

Table 5. 5. Correlation between the courtyard geometry and MRT

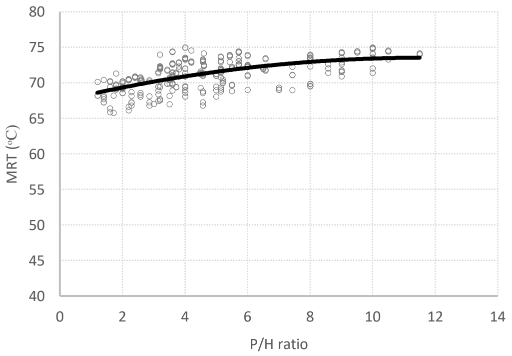
| | Courtyard area | Courtyard orientation | W/L | W/H | P/H |
|---|---|---|---|---|---|
| Pearson coefficient | 0.151 | 0.047 | 0.084 | 0.231 | 0.158 |
| Sig. (P-value) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



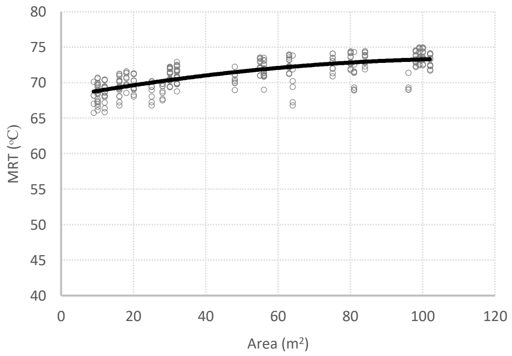

5.10.A. The correlation between the Width/Length (W/L) ratio and MRT



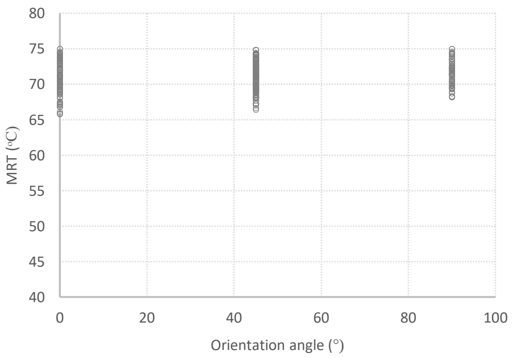

5.10.B. The correlation between the Width/Height (W/H) ratio and MRT



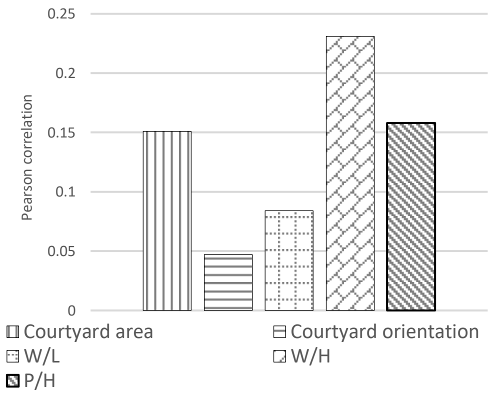

5.10.C The correlation between the Periphery/Height (P/H) ratio and MRT




5.10.D. The correlation between the courtyard area and MRT




5.10.E. The correlation between the courtyard orientation and MRT




5.10.F. Strength of impact of courtyard geometry variables on MRT.

Figure 5. 10. Impact of courtyard geometry on MRT
All of the presented data is for summer at 12:00 PM- same correlation is applied to other times and other seasons. (Refer to Appendix F for further details)

### 5.2.4. Courtyard air velocity

A. Impact of courtyard geometry on air velocity

The results show that changing the courtyard geometry has a limited impact on air velocity in courtyards. Figure 5.11 shows similar air velocities in thirty different courtyard configurations. The correlation analysis confirms that the geometric properties of courtyards do not affect their air velocity. Figure 5. 12 shows scattered data that does not indicate a direct impact for any of the explored geometric variables on air velocity in courtyards. However, it can be seen that the courtyard space has low levels of air velocity in comparison to outside city space. The boundaries of courtyards do not allow air to penetrate inside the courtyard space. The air velocity inside courtyards is reduced to around 80% of the outside air velocity.

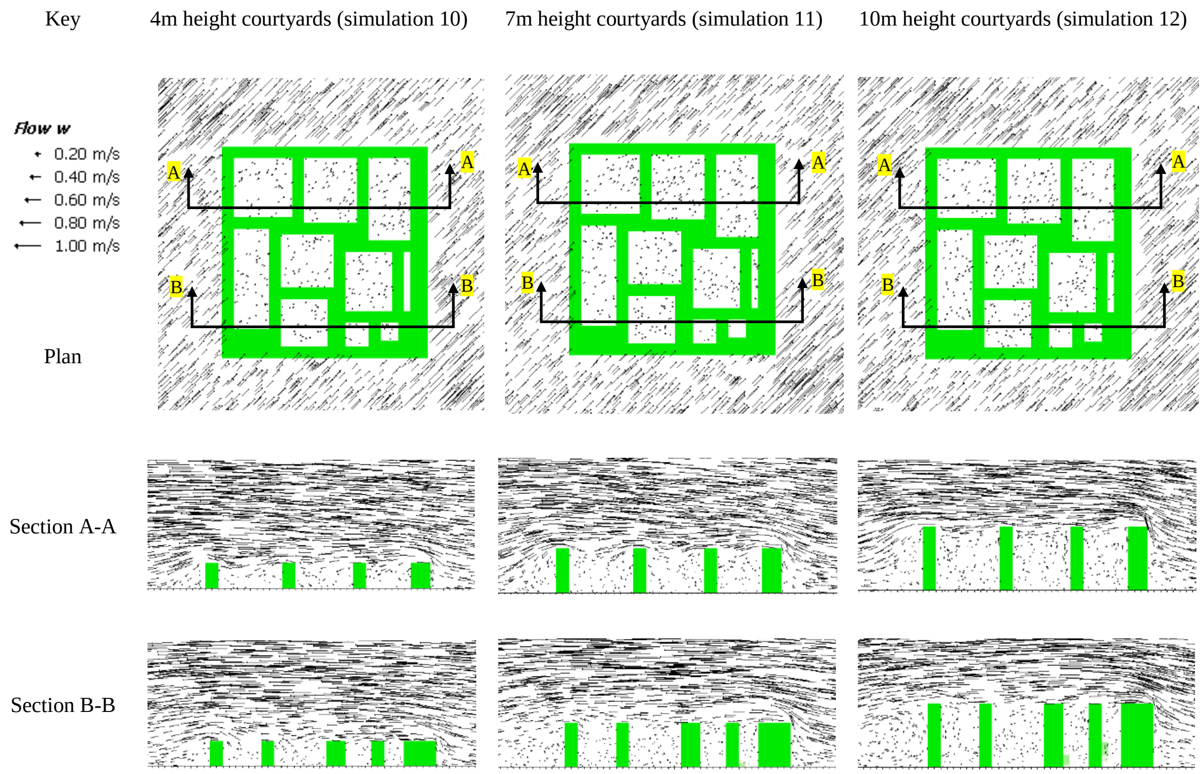



Figure 5. 11. Air velocity in thirty different courtyards in comparison to outside

B. Practical implications

These results indicate that, as with the case of air temperature, designers and architects cannot manipulate air velocity in courtyards by manipulating their geometric properties. If the target is to affect air movement and natural ventilation in courtyards, other strategies may need to be considered, such as using mechanical fans or incorporating wind-catchers and activating cross ventilation.

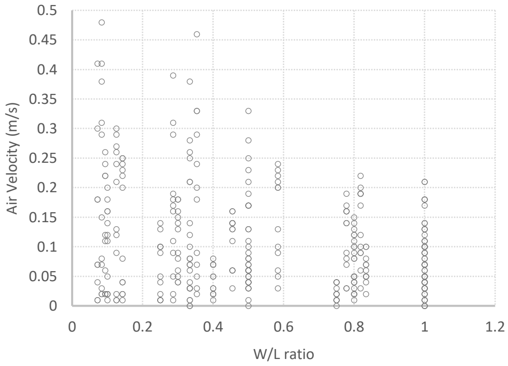



Figure 5.12.A. The correlation between the Width/Length (W/L) ratio and air velocity

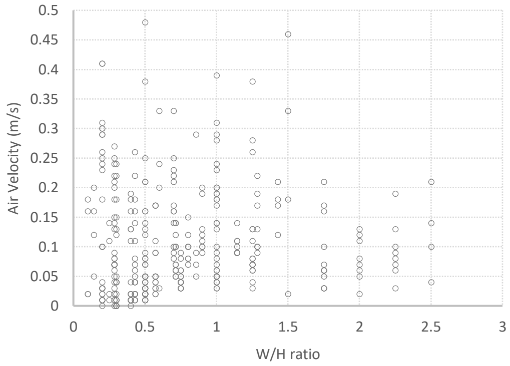



Figure 5.12.B. The correlation between the Width/Height (W/H) ratio and air velocity

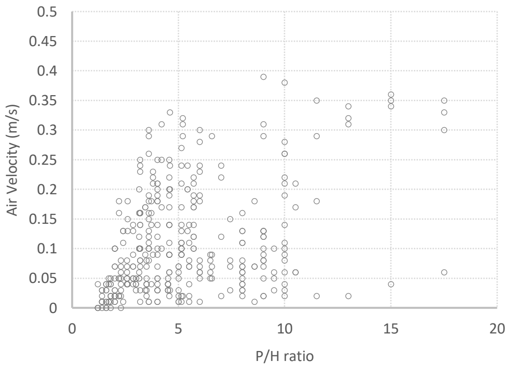



Figure 5.12.C. The correlation between the Periphery/Height (P/H) ratio and air velocity

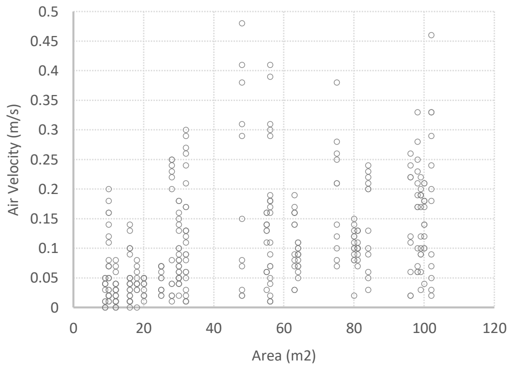



Figure 5.12.D. The correlation between the courtyard area and air velocity

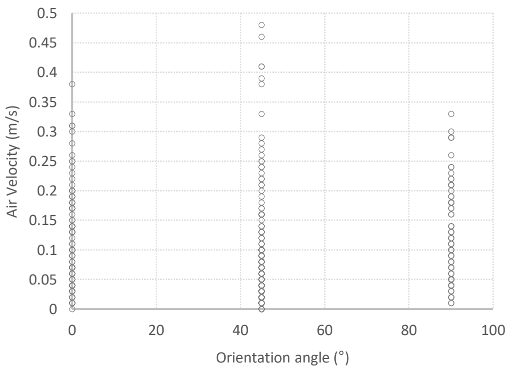



Figure 5.12.E. The correlation between the courtyard orientation and air velocity

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Figure 5. 12. Impact of courtyard geometry on air velocity

All of the presented data is for summer at 12:00 PM- same correlation is applied to other times and other seasons. (Refer to Appendix F for further details)

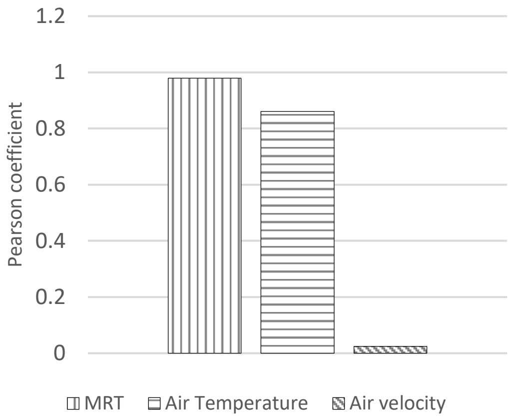
### 5.2.5. Courtyards Globe temperature (Occupants' thermal sensation)

A. Impact of microclimatic factors on globe temperature

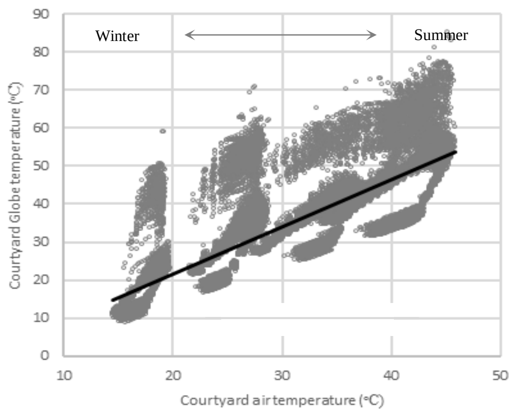
Results show that air temperature, air velocity and MRT affect the globe temperature in courtyards. They have a statistically significant impact on globe temperature (P-Value < 0.05) (Table 5. 6). However, the Pearson coefficient shows that they are not of the same level of impact. The most effective factor of them is MRT followed by air temperature, while air velocity is of minimal impact (Figure 5. 13).

Table 5. 6. Correlation between globe temperature and effective climatic factors

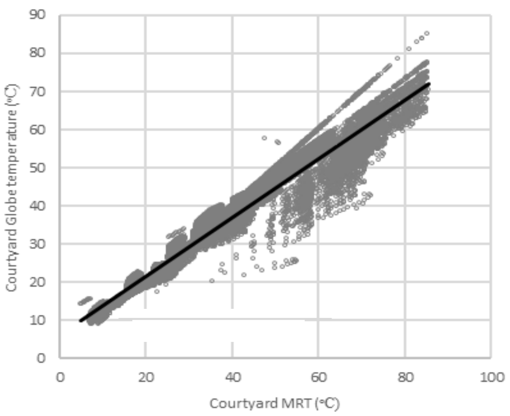
| | MRT | Air velocity | Air temperature |
|---|---|---|---|
| Pearson coefficient | 0.979 | 0.024 | 0.861 |
| Sig. (P-value) | 0.00 | 0.00 | 0.00 |



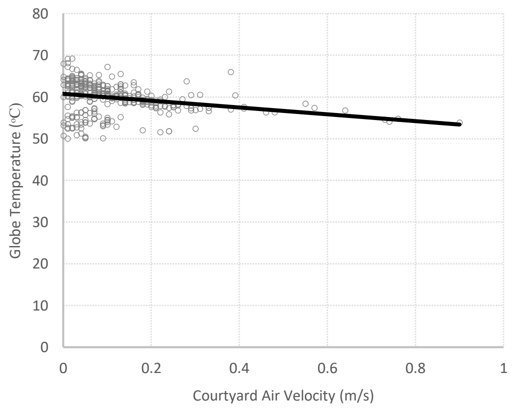

5.13.A. Strength of impact of each of the three microclimatic factors on globe temperature




5.13.B. The correlation between air temperature and globe temperature




5.13.C. The correlation between MRT and globe temperature




5.13.D. The correlation between air velocity and globe temperature

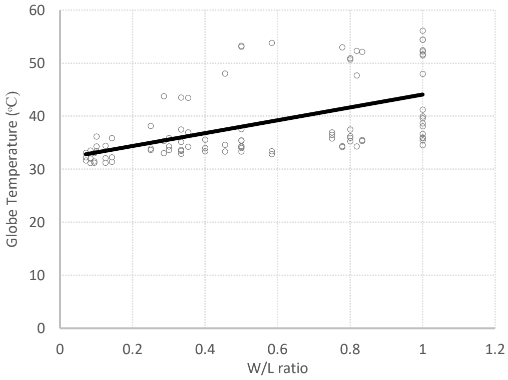
Figure 5. 13. Impact of microclimatic factors on globe temperature
(Refer to Appendix F for further details)

B. Impact of courtyard geometry on globe temperature

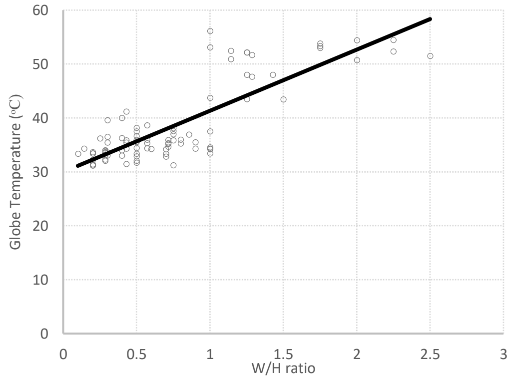
The impact of courtyard geometry on globe temperature results from the effect of the geometric properties on each of the three examined microclimatic factors. The statistical analysis shows that all of the examined geometric properties have a statistically significant impact on globe temperature in courtyards (P-value < 0.05) (Table 5. 7). The most significant impact of courtyard geometry on globe temperature comes through their impact on MRT, which is found to be the most effective microclimatic factor on globe temperature in courtyards. Air velocity and air temperature are not affected by the geometric properties of courtyards. Accordingly, as they have the most significant impact on MRT, the W/H and P/H ratios are the most effective geometric properties on globe temperature in courtyards (Figure 5. 14). The orientation and the rectangularity of the courtyard plan (W/L) are of limited impact on globe temperature as they do not have a significant impact on insolation and MRT.

Table 5. 7. Correlation between the courtyard geometry and globe temperature

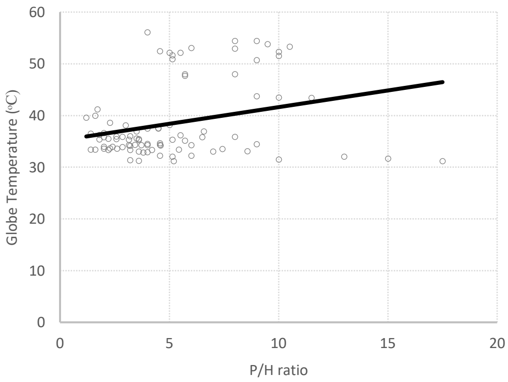
| | Courtyard area | Courtyard orientation | W/L | W/H | P/H |
|---|---|---|---|---|---|
| Pearson coefficient | 0.151 | 0.047 | 0.084 | 0.231 | 0.158 |
| Sig. (P-value) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



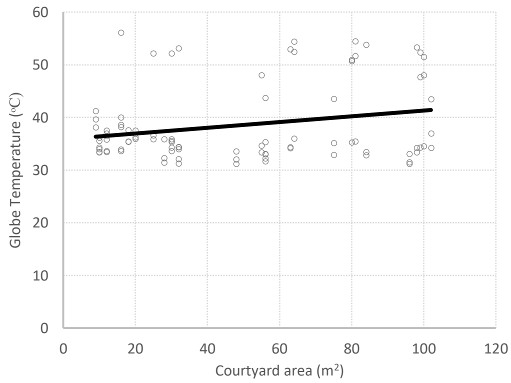

5.14.A. The correlation between the Width/Length (W/L) ratio and globe temperature



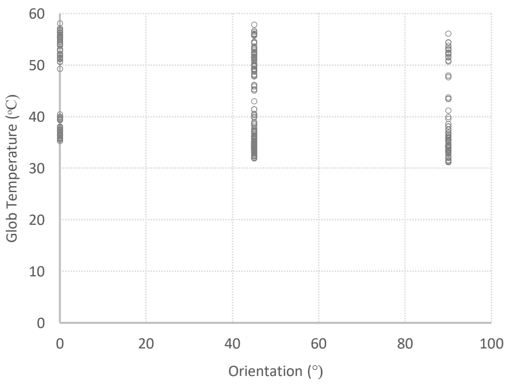

5.14.B. The correlation between the Width/Height (W/H) ratio and globe temperature



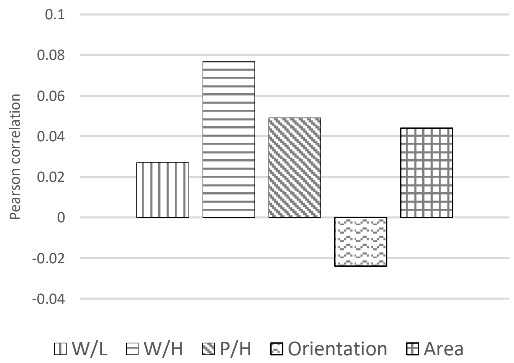

5.14.C. The correlation between the Periphery/Height (P/H) ratio and globe temperature




5.14.D. The correlation between courtyard area and globe temperature




5.14.E. The correlation between the courtyard orientation and globe temperature




5.14.F. Strength of impact of each of the geometric properties on globe temperature

Figure 5. 14. Impact of courtyard geometry on globe temperature

All of the presented data is for spring at 12:00 PM - same correlation is applied to other times and other seasons. (Refer to Appendix f for further details)

C. Practical implications

Architects and designers can influence globe temperature in courtyards, which correlates directly with the thermal sensation of occupants, through manipulating the geometry of the courtyard. They can make a difference of up to 20.0 °C in globe temperature by targeting the insolation level and MRT in courtyards. MRT is affected by courtyard geometry, and it is found to be the most effective microclimatic factor on the thermal sensation of occupants in courtyards. Accordingly, to have low globe temperature, designers need to reduce the W/H ratio to ensure low insolation level and low MRT. However, this is not applicable to air temperature and air velocity, although they can affect globe temperate in courtyards. The reason is that designers and architects cannot affect globe temperature by manipulating courtyard geometry to affect air temperature and air velocity. Both of these two microclimatic factors are not affected by courtyard geometry. If the aim is to influence air temperature and air velocity, strategies other than manipulating the geometry of the courtyard need to be adopted. This can include, for instance, investing other environmental elements of courtyard buildings, such as the wind-catcher to support the air movement and vegetation and water surfaces to activate the evaporative cooling. Another approach is to use mechanical systems such as heaters, fans or evaporative coolers.

Figure 5. 15 shows thermal conditions in two courtyards in summer and winter. The first courtyard is a shallow and large courtyard. Amongst the 360 examined courtyards, it is the one with the maximum W/H, P/H, W/L ratios and the largest area. The other courtyard is a small and deep one. Among the examined courtyards, it has an inverse geometry compared to the previous design. In this figure, it can be seen that, for the same outdoor climatic conditions, the globe temperature in courtyards follows MRT in its trend, which is affected by courtyard geometry. Air temperature and air velocity are almost the same in both courtyards as they are not affected by courtyard geometry. The difference in globe temperature between these two courtyard options is of up to 20.0 °C.

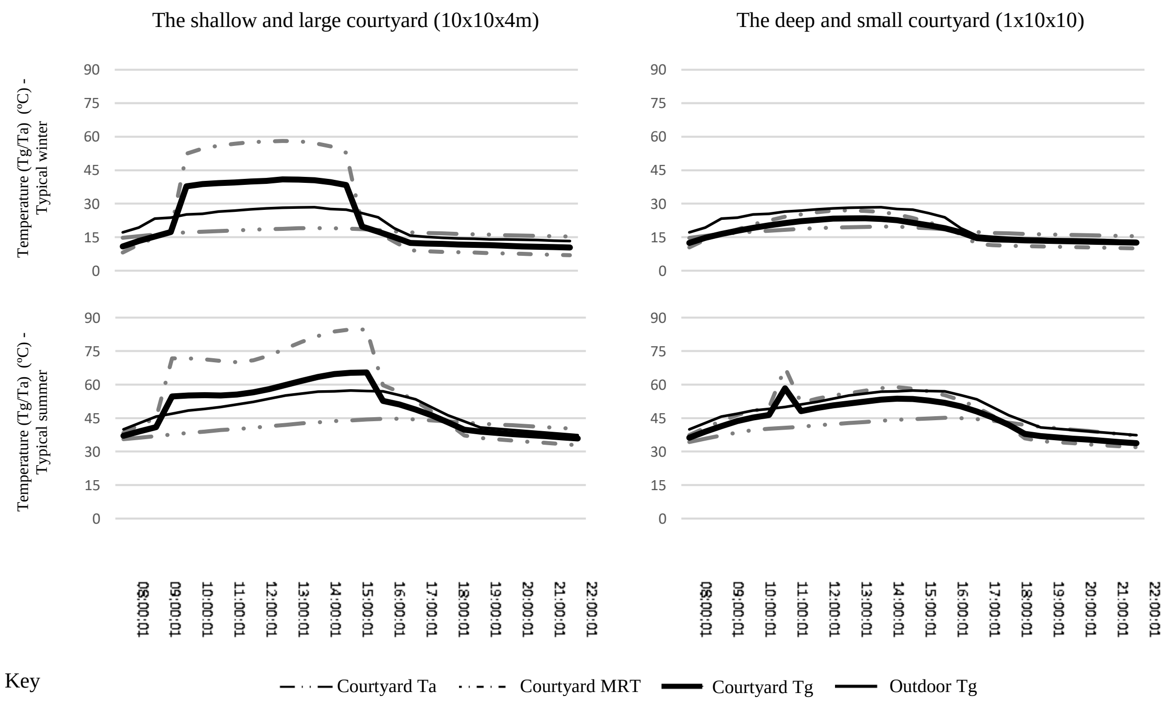



Figure 5. 15. Summer and winter conditions in warm and cold courtyards

### 5.2.6. Predicting annual courtyards conditions in Baghdad

The simulation experiments determined thermal conditions in courtyards for four days representing the typical climatic conditions of the four seasons in Baghdad. It was not possible to conduct simulation experiments for the whole year due to the limitations of time and resources. However, to determine CTUI index and assess the thermal efficiency of courtyards in Iraq, it was essential to predict globe temperature in courtyards in Baghdad for the whole year. For this purpose, regression analysis was applied to the simulation results in order to develop an equation that can interpolate the annual globe temperature in courtyards in Baghdad. This equation includes the courtyard geometric variables, except the orientation, and outdoor globe temperature. Courtyard orientation was excluded because the regression analysis shows that there is no statistically significant correlation with globe temperature in courtyards. Outdoor globe temperature was included in the equation for its inclusive representation of the outdoor relevant factors, which highly affect courtyards' conditions as they are outdoor spaces. The factors in the regression analysis explain 90% of the changes in globe temperature in courtyards (Adjusted $R^2$ = 0.904).

$$Courtyard\ Tg = -3.638 + (-0.811 \times W/L) + (2.808 \times W/H) + (0.044 \times P/H) + (-0.008 \times Area) + (1.035 \times Outdoor\ Tg)$$

As it may not always be easy to obtain the outdoor globe temperature, another regression analysis was carried out in which outdoor globe temperature was replaced by the outdoor air temperature. The latter is easier to be obtained and of a statistically significant impact on courtyard globe temperature. However, the explanatory power of this regression equation is lower than the previous one: 76.1% (Adjusted $R^2$ = 0.761).

$$Courtyard\ Tg = -2.491 + (-0.820 \times W/L) + (2.828 \times W/H) + (0.041 \times P/H) + (-0.008 \times Area) + (1.095 \times Outdoor\ Ta)$$

There are two issues that need to be considered in using these equations. First, although the equations include outdoor air temperature and globe temperature to increase their accuracy, their applicability needs to be examined before used in a place of different climatic conditions compared to Baghdad. The second issue is that the used simulation model was calibrated using two courtyard houses in Baghdad. The two houses used to build the simulation model have walls with specific thermal properties. Accordingly, the developed regression equation may not be applicable to courtyards that have walls of different thermal properties. The reason is that having different properties may lead to different behaviour regarding heat storage and release, which will in turn cause a different MRT, and, as a result, different globe temperature.

### 5.2.7. Courtyards conditions around the country

This research conducted intensive simulation work to determine the thermal conditions of courtyards in Baghdad. Due to the limitations of time and resources, it could not repeat similar simulation work for other places in Iraq. However, the research conducted a smaller set of Envi-met simulation experiments which included simulating the hottest and coldest courtyards during typical summer and winter in six cities representing a wide range of climatic conditions in the country. The aim of this simulation work was to indicate the possible range of courtyards' thermal conditions in the rest of Iraq in comparison to Baghdad. The results show that globe temperature in courtyards in other cities is different from Baghdad. Figure 5. 16 shows the trend of globe temperature in two courtyards during summer and winter around the country. It can be seen that there is a difference of 5.0°C to 15.0°C between globe temperatures in courtyards in the different cities. As the tested courtyards are identical in all of the examined cities, the differences in globe temperatures in courtyards are due to the differences in climatic conditions around the country (Table 4. 4). These climatic differences include air temperature, air velocity and solar radiation intensity. This result indicates that different courtyard configurations may need to be considered around the country to suit the requirements of the climatic conditions of its various regions.

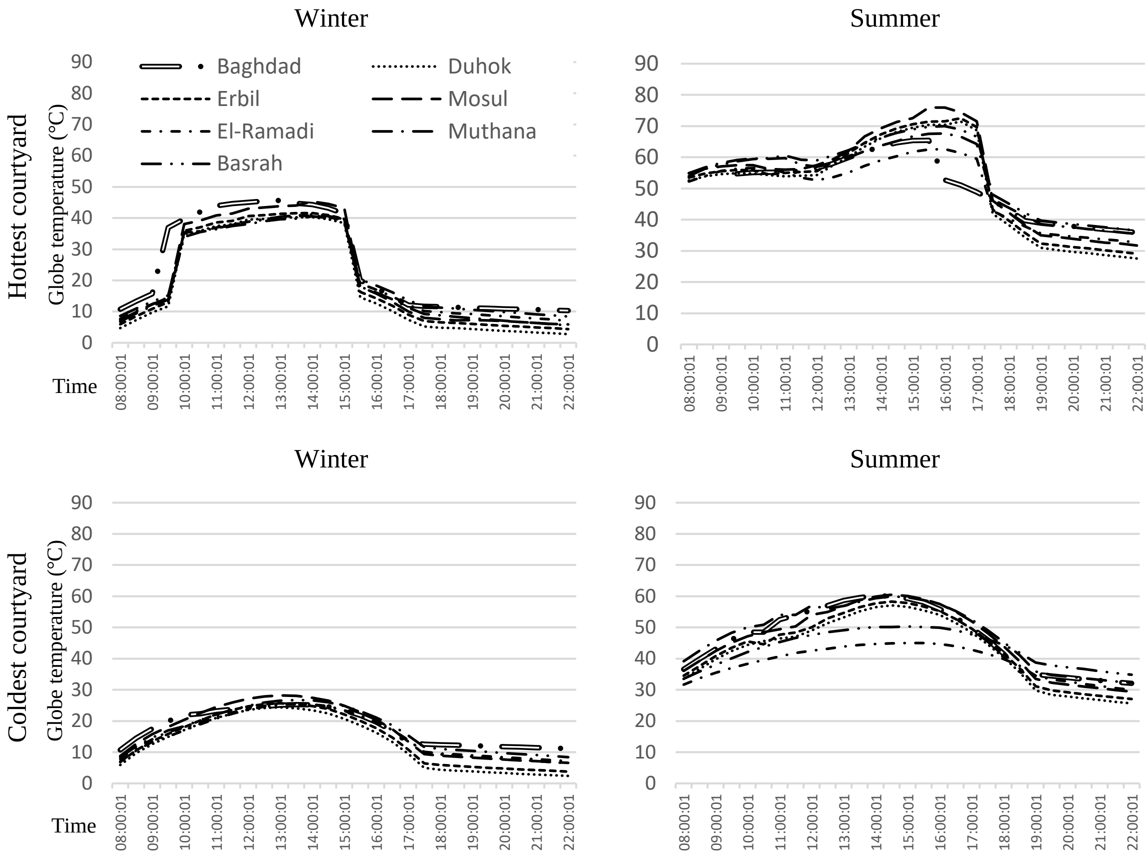



Figure 5. 16. Globe temperature in coldest and hottest courtyards in Iraq

## 5.3. Assessing courtyards' thermal efficiency

This research followed two steps to assess the thermal efficiency of courtyards. The first one was to determine the extent of thermal comfort in courtyards by using the developed adaptive thermal comfort model. The second step was to compare thermal comfort extents in courtyards with a typical street space in Iraq. These two steps enable to assess to which extent courtyards can be thermally comfortable for Iraqis and whether they improve the thermal conditions of buildings, if introduced. Courtyards demonstrate thermal efficiency in case they offer a higher level of thermal comfort than street spaces. If it is the case, it can be concluded that courtyards may improve the thermal efficiency of buildings. The reason is that they may offer a more thermally comfortable outdoor space for occupants to use, and mitigate outdoor conditions for indoor spaces to interact with instead of forcing those indoor spaces to interact with harsh climatic conditions.

### 5.3.1. Thermal comfort extent in courtyards

This research assessed the extent of thermal comfort in courtyards by developing the Courtyard Thermal Usability Index (CTUI). For each courtyard, CTUI is the ratio of thermally comfortable hours to the total annual occupation hours, which are from 8:00 AM to 10:00 PM (Salman, 2016). The research used the thermal conditions of courtyards from the simulation experiments combined with the adaptive comfort model from the thermal comfort survey to determine CTUI for each of the 360 examined courtyard options.

Figure 5. 17.A. shows the ranking of courtyards according to their annual CTUIs. The courtyards that offer the highest level of thermal comfort around the year are the ones that offer a balance between satisfying thermal comfort limits around the year, including hot and cold conditions. In this graph, it can be seen that the highest CTUI level courtyards can offer is 0.38 (Figure 5. 17). This considers the 10.0°C comfort range in the adaptive comfort model, which has a 90% confidence level (Figure 5. 5). If the narrower comfort range is considered, the highest CTUI courtyards can offer is 0.16. In other words, annually, courtyards can offer between 16% to 38% comfortable hours out of the total occupation hours. Regarding the not comfortable period, hot hours represent the main challenge. Affected by the courtyard geometry, in the best-case scenario, occupants experience, annually, around 3500 hot hours. The number of cold hours, in the worst-case cold scenario, does not exceed 1400 hours.

The CTUI of courtyards and the number of potential cold and hot hours to be experienced by occupants are affected by the geometric properties of courtyards, especially the W/H ratio. This is due to the impact of the geometry of courtyards on their microclimatic conditions, especially MRT. Figure 5. 17 shows three diagrams demonstrating the impact of W/H ratio, which is the dominant geometric property, on CTUI and the number of cold and hot hours. In figure 5.17.A, it can be seen that CTUI is almost stable at the highest level until W/H ratio exceeds the value of 1.0, where CTUI starts to decrease with a further increase of the W/H ratio. The same correlation is applied to the impact of W/H ratio on the number of cold and hot hours (Figure 5.16.B; 5.16.C). This performance is reasonable and can be understood by considering that increasing the W/H ratio above 1.0 will have a limited impact on insolation levels and MRT in courtyards, which are the primary triggers of the changes in the CTUI and the number of cold and hot hours. The reason is that above W/H ratio of 1.0, the courtyard space becomes shallow and attains the maximum possible insolation level.

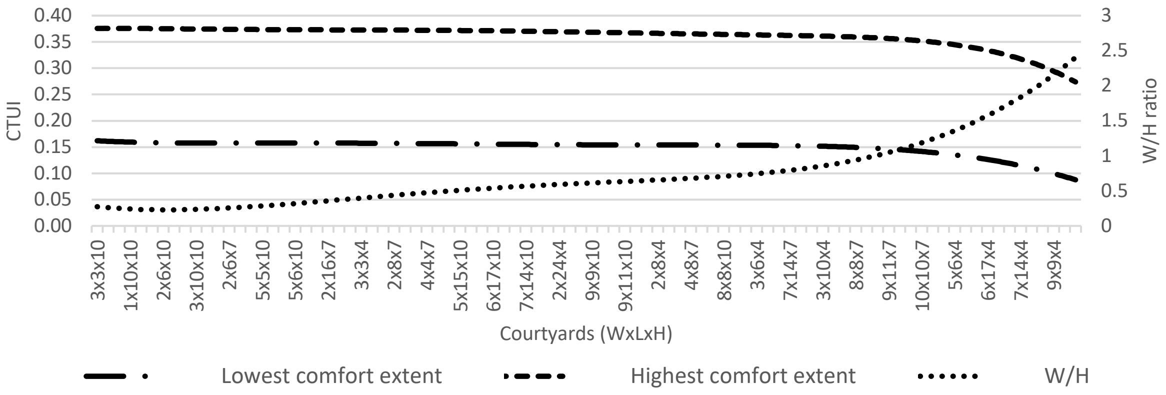



Figure 5.17. A. The correlation between the CTUI and W/H ratio

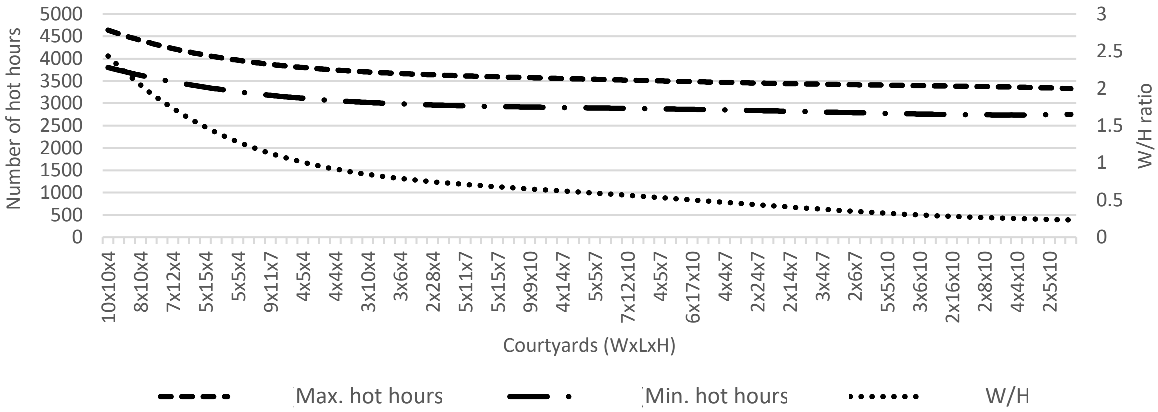



Figure 5.17. B. The correlation between the number of hot hours and W/H ratio

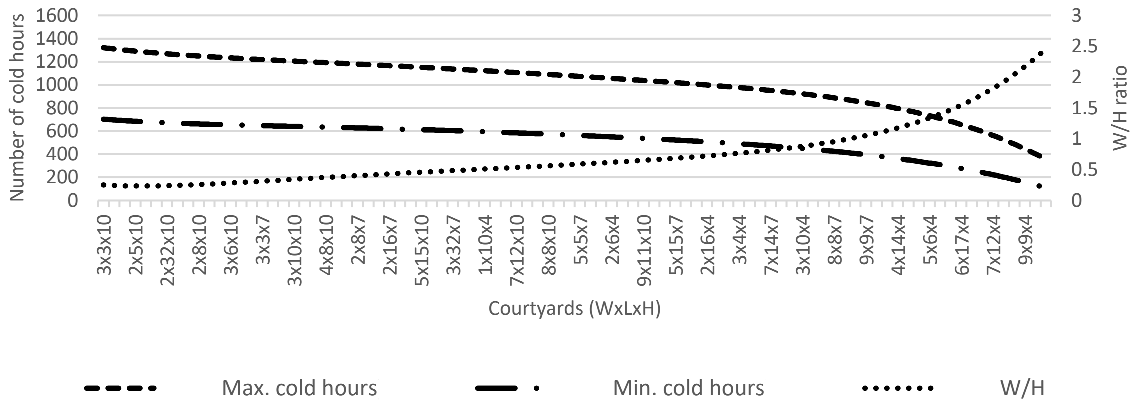



Figure 5.17. C. The correlation between the number of cold hours and W/H ratio

Key
Highest comfort extent: CTUI if the wide-range adaptive comfort model is considered.
Lowest comfort extent: CTUI if the narrow-range adaptive comfort model is considered
Max. hot hours: the number of hot hours if the narrow-range adaptive comfort model is considered.
Min. hot hours: the number of hot hours if the wide-range adaptive comfort model is considered.
Max. cold hours: the number of cold hours if the narrow-range adaptive comfort model is considered.
Min. cold hours: the number of cold hours if the wide-range adaptive comfort model is considered
W/H ratio: courtyard Width/Height ratio

Figure 5. 17. Impact of W/H ratio on CTUI and the number of cold and hot hours in courtyards over a year (Based on the adaptive comfort model 'Figure 5.5')

Figures 5.18; 5.19 and 5.20 show the extent of thermal comfort and the possible range of daily thermal conditions in courtyards in Baghdad, which are significantly affected by the insolation level and the resulted MRT:

- Figure 5.18 shows an example of the daily thermal conditions in the most thermally comfortable courtyards among the 360 courtyards. The W/H ratio in this courtyard is 0.5, and its CTUI level is 0.16 to 0.38 (Figure 5.17.A). During the daily occupation hours, this courtyard is comfortable during the daytime in winter and the early morning hours and the evening in spring and autumn. Its cold period is during the first morning hour and the evening in winter. This courtyard is hot during most of the daytime in spring and autumn and the whole occupation time in summer. The thermal performance of this courtyard is significantly affected by its insolation level and the resulted MRT. This impact can be seen in the dramatic changes in globe temperature in summer between 11:00 and 14:00, which results from the courtyard not being shaded during this period.
- Figure 5.19 shows an example of the courtyards with the least number of cold hours among the examined courtyards. In this courtyard, the W/H ratio is 2.5, which means low shading levels and high MRT. As a result, in comparison to other courtyard options, the globe temperature in this courtyard is high, and the CTUI is low: 0.09 – 0.27. The comfortable period in this courtyard is shorter comparing to the first courtyard, and it is for a limited time in winter, spring and autumn. It is cold during the evening in winter, and it is hot in summer and during the majority of the occupation hours in the other seasons. This courtyard has high globe temperature and low CTUI due to having high insolation levels. The impact of the insolation level can be seen in the dramatic changes in globe temperature in all seasons. For instance, the globe temperature increases by around 20°C in winter at 9:00 and then decreases at around 15:00, which results from being not shaded during these hours. This applies to the other three seasons.
- Figure 5.20 shows an example of the courtyards with the least number hot hours. This courtyard is of low W/H ratio: 0.3. As a result, it is among the courtyards with the highest shading levels and lowest MRT. The CTUI level and the daily thermal conditions of this courtyard is similar to the courtyard in Figure 5.18. They are both of 0.16 to 0.38 CTUI. However, the distribution of the comfortable, cold and hot hours around the daily occupation hours in the four seasons is slightly different. This courtyard is slightly colder during winter than the courtyard in Figure 5.18. However, this courtyard offers a comfortable period during the late evening hours in summer, which is not the case with the other option. As with the other two courtyard options, the hot conditions are the most challenging conditions. This courtyard is hot during most of the time in summer, spring and autumn. This courtyard shows less dramatic changes in its globe temperatures, which is due to being totally shaded for most of the time around the year.

In summary, the thermal conditions of courtyards are significantly affected by their insolation levels. On a daily basis, shaded courtyards can be thermally comfortable during the daytime in winter, and early morning and evening hours in spring and autumn. All courtyards are hot during most of the time in summer, spring and autumn. A cold period in courtyards can be expected in winter during the evening hours. This confirms that the most challenging conditions in courtyards are the hot conditions and that the higher the shading level, the higher overall thermal comfort level.

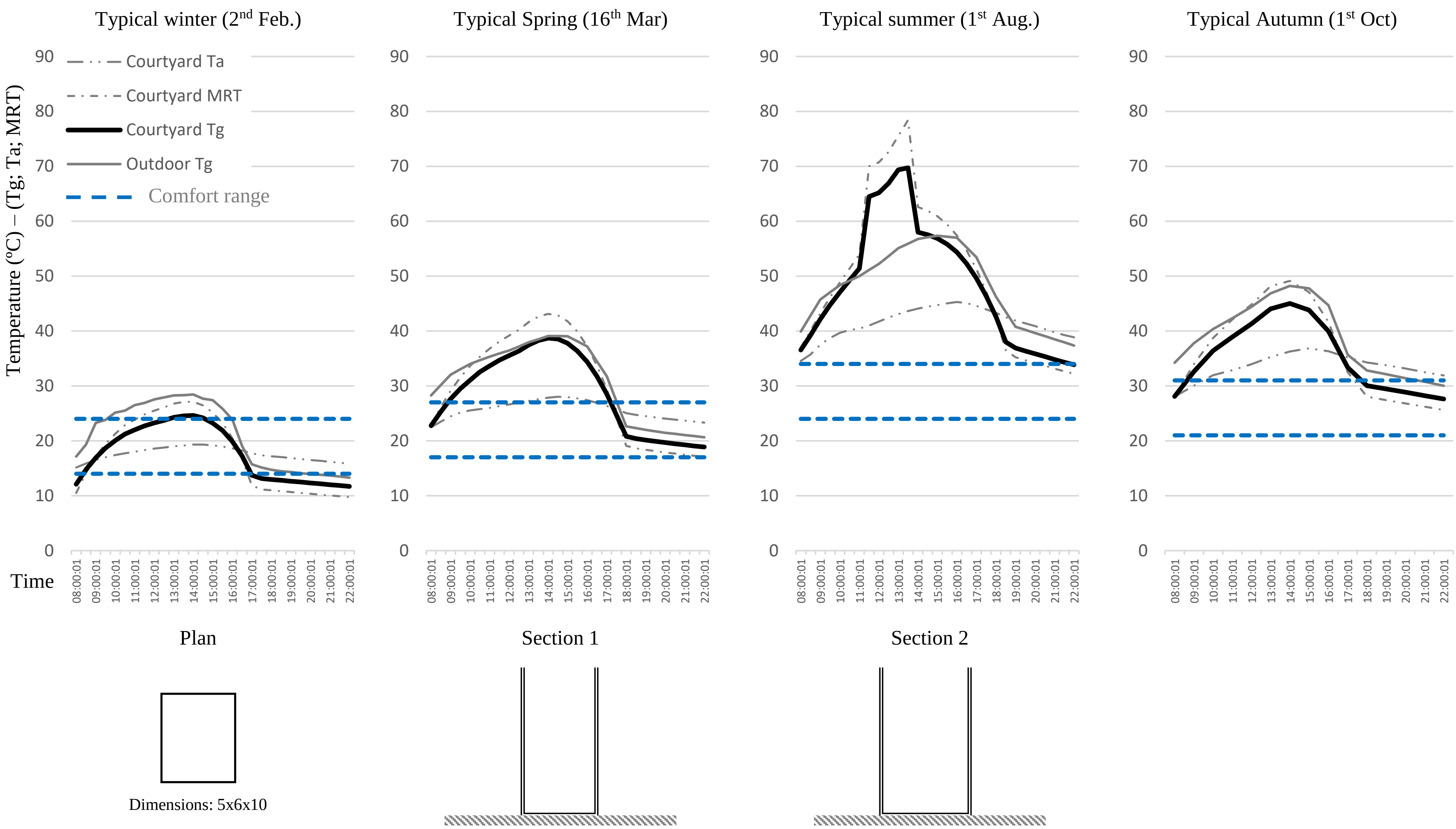



Figure 5. 18. Geometry and daily thermal conditions of one the most thermally comfortable courtyards

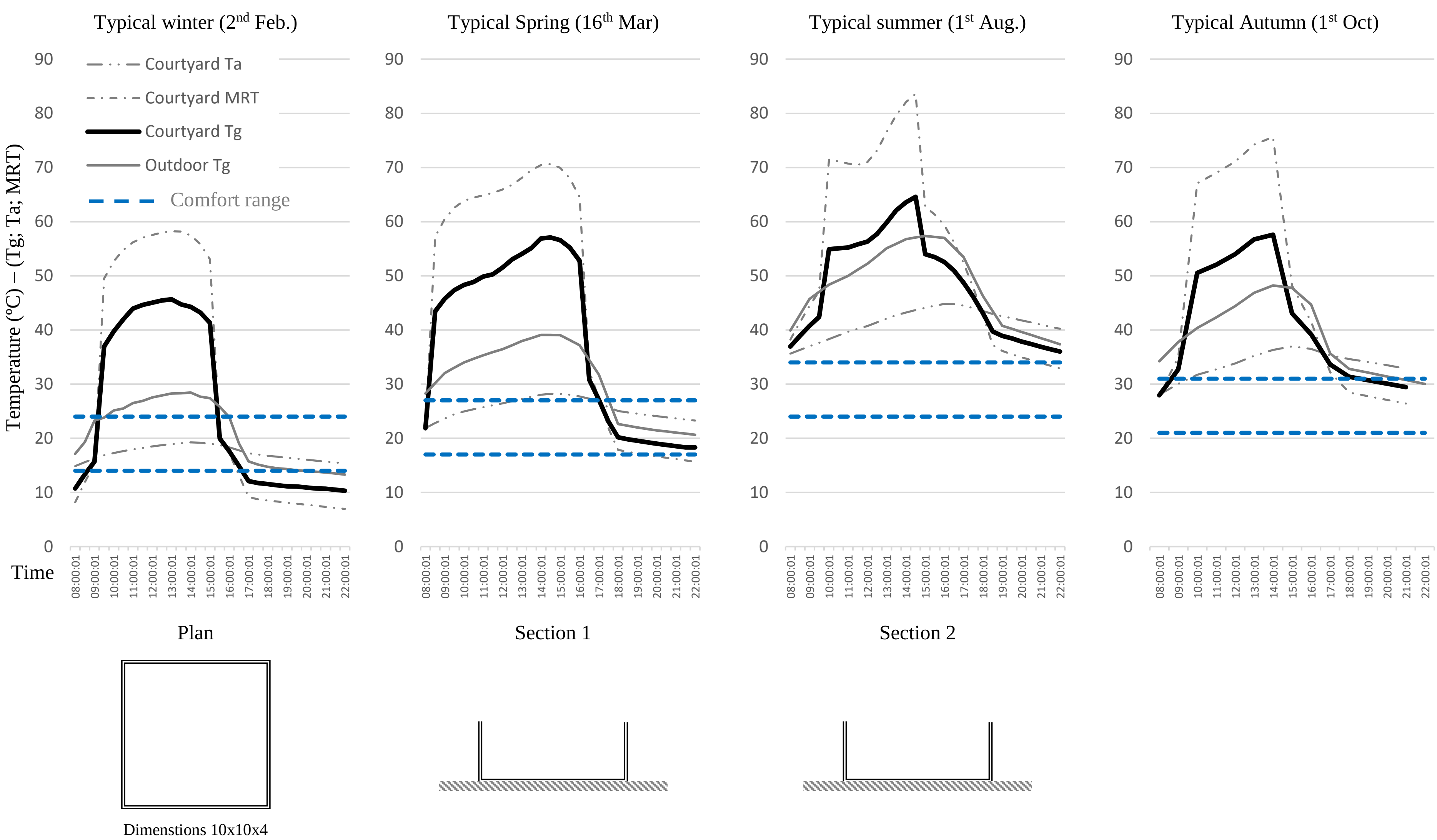



Figure 5. 19. Geometry and daily thermal conditions of one of the courtyards with the least annual cold hours

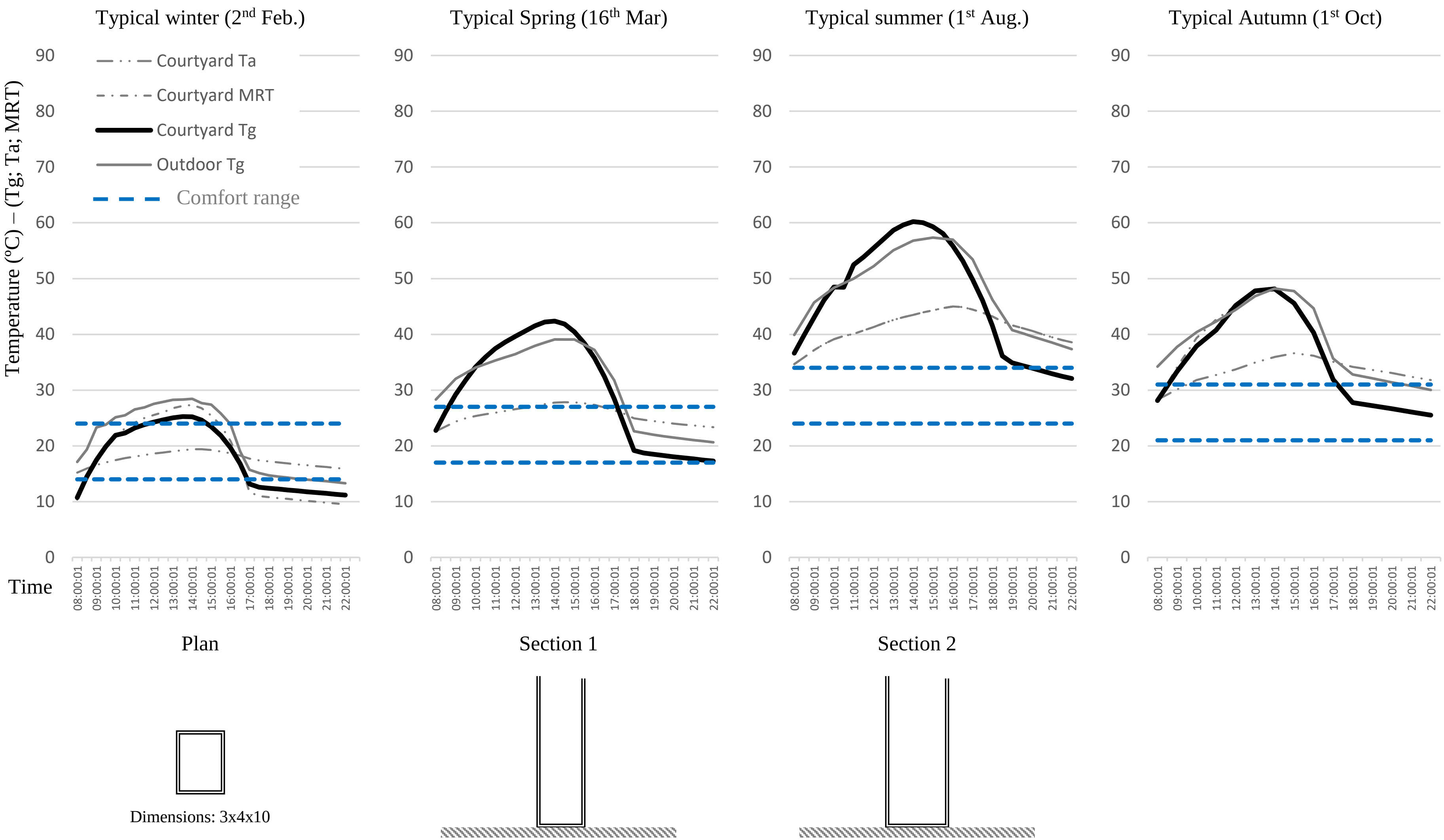



Figure 5. 20. Geometry and daily thermal conditions of one of the courtyards with the least annual hot hours

### 5.3.2. Thermal comfort in courtyards in comparison to typical street spaces

This study compared the thermal conditions in courtyards to typical street spaces in Iraq. Following assessing the level of thermal comfort that courtyards can offer to occupants, the study aimed from this comparison to determine the potential thermal advantages of introducing courtyards to buildings. The comparison is based on that indoor spaces in courtyard buildings interact with outdoor conditions through courtyards, while non-courtyard buildings interact with outdoor conditions through the street space. Accordingly, if courtyards offer a more thermally comfortable environment than street spaces, then the whole courtyard building is expected to provide a more thermally comfortable environment. A simulation experiment was carried out to determine the thermal conditions of two typical street spaces in Baghdad, and outcomes were compared with results for three courtyard options: the most thermally comfortable courtyard and the ones with the least cold and hot hours (Figures 5.18; 5.19; 5.20).

Figure 5. 21 shows the globe temperature in the three courtyard options and two typical street spaces in Baghdad. In this figure, it can be seen that the examined typical street spaces are less thermally comfortable than the examined courtyards in winter. The globe temperature in the courtyards is 10°C - 30°C higher than the examined typical street spaces. In summer, although they are still not comfortable, all of the three courtyards are colder during the early morning hours and the late afternoon hours and the evening. However, courtyards are warmer for around four hours during the late morning hours and afternoon, in summer. At 12:00, the globe temperature in the courtyards is 5°C - 15°C higher than the examined typical street spaces.

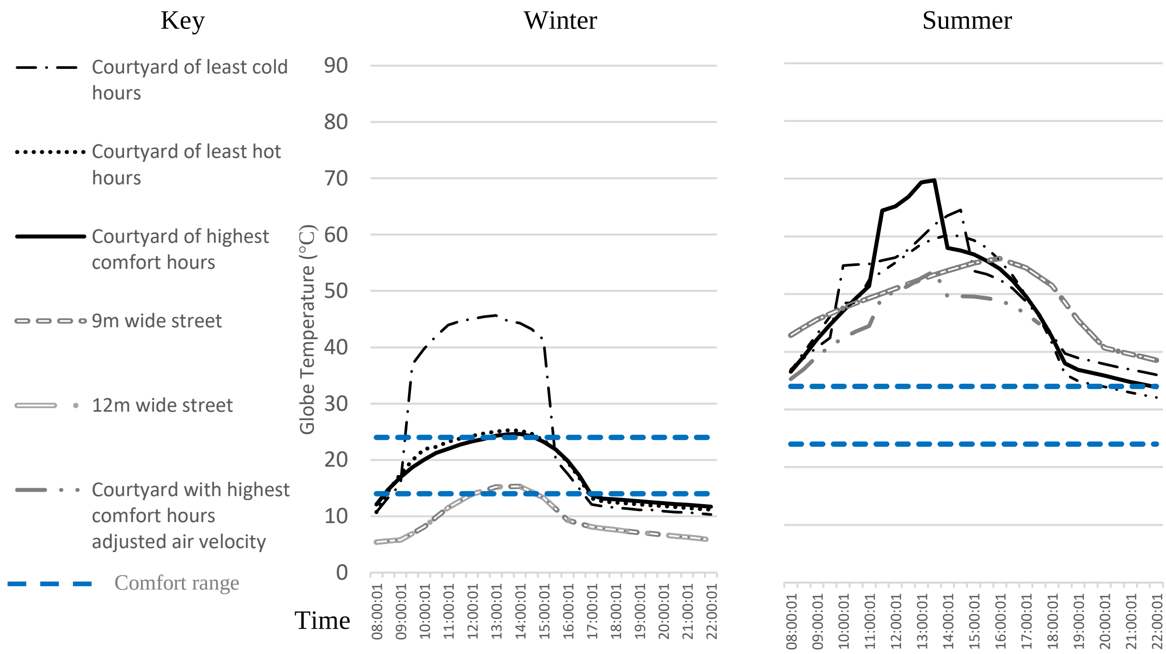



Figure 5. 21. Comparison between thermal conditions in courtyards and typical street spaces

In comparison to typical street spaces, courtyards offer a higher level of thermal comfort for the majority of the occupation hours. The prime reason that turns courtyards warmer during winter and a part of the day during summer is the air velocity. While both space typologies are exposed to solar radiation, the typical street space is open, which allows higher air velocity than the examined courtyard space. The higher air velocity leads to a lower globe temperature. Between the two compared simulation scenarios, the air velocity in the street space is ten times higher than the air velocity in the courtyards (Figure 5.22). In the simulated cases, at 12:00 PM, in summer, if the thermally comfortable courtyard space has the same air velocity as in the street space, the globe temperature in the courtyard will be the same as the typical street spaces, but of lower levels during the rest of the day (Figure 5. 21).

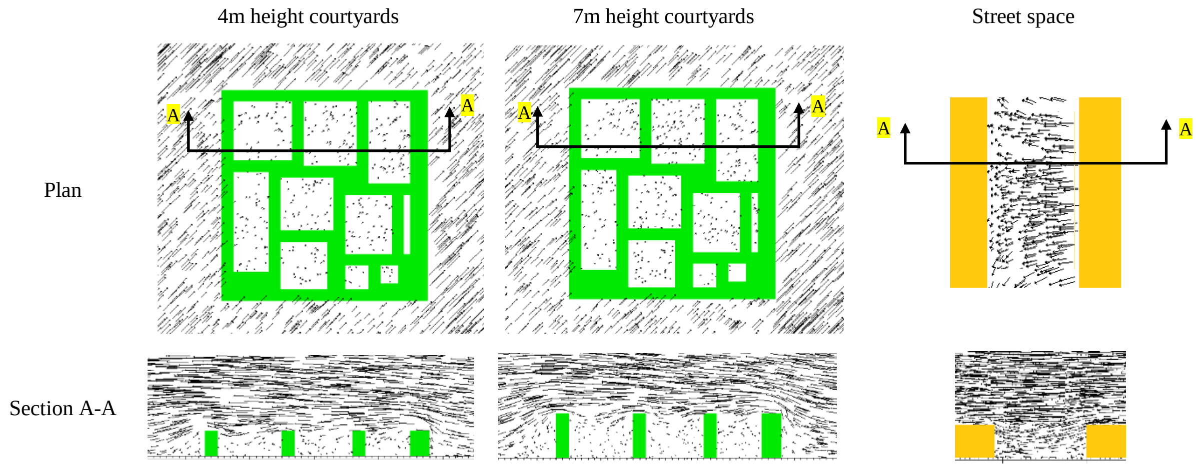



Figure 5. 22. Air velocity in twenty different courtyards and a street space (Envi-met 4.2 simulation)

## 5.4. Results discussion

This chapter presents the results of the thermal comfort survey, the simulation experiments and the assessment of thermal comfort extent in courtyards. In this section, these results are discussed.

### 5.4.1. The developed adaptive thermal comfort model

This research conducted a thermal comfort survey in Iraq for a year; 6450 thermal comfort votes were recorded, which has not been done by a previous study in Iraq or other countries in the geographical region. Survey results were used to develop an adaptive thermal comfort model for residential buildings in Iraq. According to the proposed model, the upper thermal comfort limit for Iraqis in summer is 35°C, and the lower comfort limit in winter is 14 °C (Figure 5. 5). Figure 5. 23 shows a comparison between the perfect comfort limits determined by this study, and other studies in regional countries explored in chapter three (Table 3. 1), assuming that globe temperature and air temperature are similar in indoor spaces. This graph shows that the results of the current study are similar to the determined comfort limits by Webb, 1964 in Baghdad around fifty-five years ago. However, the upper comfort limit in the study of Egypt is 3°C higher than the upper comfort limit determined by the current study (Farghal & Wagner, 2010). The similarity between the results of this study and Webb study might be reasonable as both studies are conducted in the same context. It is interesting to note that the upper limit is higher in Egypt than in Iraq, while the contextual temperature of Egypt is around 15°C lower than Iraq. This difference can be traced to the fact that study in Egypt was conducted in naturally ventilated buildings, while the current work focuses on mixed mode ventilation buildings. Studies have shown that the thermal comfort threshold of people is affected by their context. People are found to be more tolerant to thermal conditions in outdoor or naturally ventilated indoor spaces than in indoor spaces where air-conditioning systems are available, which is the case of mixed-mode ventilation spaces. Air-conditioning systems enable people to have a range of control over their environments, which narrows their comfort range

(Aljawabra, 2014; Reiter & De Herde, 2003, Nikolopoulou, 2011). Differences in comfort limits can be seen when comparing the comfort limits from this study to those determined by Rashid et al., 2018 in Baghdad, Alshaikh, 2016 in Saudi Arabia and by Heidari and Sharples, 2002 in Iran. The difference between the current study and the Iraqi study can be traced back to the difference between the functions of the surveyed buildings. Rashid et al study was conducted in classrooms, while the current study was about residential spaces. People have fewer adaptation opportunities in classrooms than houses, which narrows their thermal comfort range. Regarding the differences with studies in Iran and Saudi Arabia, they can be traced back to two reasons. The first one is the climatic differences between the tested cities in Iraq, Iran and Saudi Arabia. The maximum air temperature of the latter two cases is 10°C lower than the highest temperature in Iraq. The second reason is related to the control and tolerance of occupants with and over their environments. The electricity supply stability in both of these other studies enables occupants to have a higher level of control over their environments than the participants of the current study. Figure 5. 2 shows that people in Iraq may use air-conditioning systems to reduce the temperature by around 16°C in July, but air-conditioning is not consistently available due to the electricity supply interruptions in the country (Rashid et al., 2018). The impact of this factor can be seen when comparing the results of the current study with the study of Qatar (Indraganti & Boussaa, 2018). The annual comfort limit range in the current study is of 16°C, while it is only 2°C in the study of Qatar. This difference is because of the three reasons stated above. Yet the most important factor is that the conducted study in Qatar was in air-conditioned offices for the whole year. Three out of ten surveyed buildings were without operable windows. This offered occupants significant control over their environments, which leads to occupants having minimal tolerance with changes in thermal conditions. Finally, comparing the results with the adaptive models of ASHRAE and Standard EN15251 shows that the lower comfort temperature in the present study is below the lower comfort temperature defined by both of these two standards. Similarly, the upper comfort temperature from this study is above the one defined by both standards. This difference results from the three discussed reasons above, including the difference between the Iraqi climate and the climate of the countries where the two international standards have been developed.

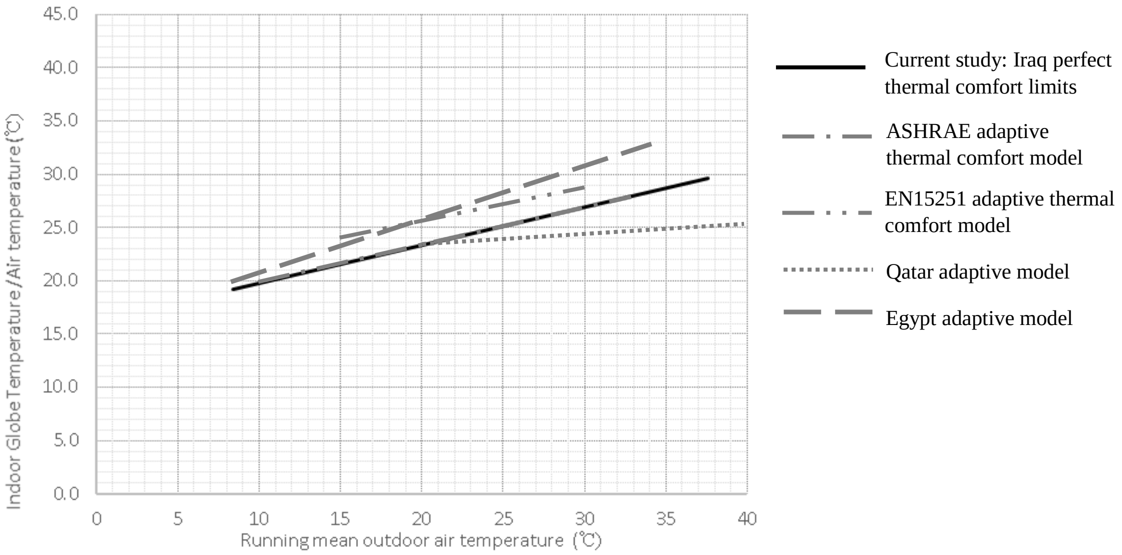



Figure 5. 23. Iraqi adaptive thermal comfort model in comparison to other models

### 5.4.2. The impact of courtyards geometry on their thermal conditions

As stated in chapter 3, studies have investigated and analysed the impact of the geometric properties of courtyards on their insolation and natural ventilation performance. However, there have been limited investigations into the impact of courtyards geometry on the thermal sensation of occupants with considering a wide-range of possible courtyard variations. This study determined air velocity, air temperature, MRT and globe temperature in 360 courtyards of different geometric properties. The study found that the most effective geometric factor on the thermal conditions of courtyards is the ratio of width to height. The most effective microclimatic factor on the thermal sensation of occupants in courtyards is MRT.

There is a high level of agreement between the results of the current study and the results of previous literature. This agreement validates the new knowledge introduced by this study. For instance, regarding the impact of courtyards geometry on insolation, the results of this study agree with the outcomes of studies in that the geometric configurations of courtyards affect their insolation performance. The courtyard insolation level decreases by increasing the courtyard depth (Muhaisen, 2006; Ahmed S Muhaisen & Mohamed B Gadi, 2006; Soflaei et al., 2017). This study's results agree with other studies, such as Mousli & Semprini, 2016; Rajapaksha, Nagai, & Okumiya, 2002; Soflaei, Shokouhian, & Shemirani, 2016, regarding the impact of courtyards geometry on natural ventilation. Courtyards experience low air velocity if there is no cross ventilation where the boundaries of courtyards are blocking outdoor air movement (Agha, 2015; T. H. Ali & B. R. Shaheen, 2013; Mousli & Semprini, 2016; B. R. Shaheen & S. L. Ahmad, 2011). Finally, the conclusion of that the MRT is the most effective factor on occupants' thermal sensation agrees with thermal comfort studies that have shown that MRT is the most effective factor on thermal sensation in external spaces in hot climate regions (Ali-Toudert & Mayer, 2006; Aljawabra, 2014; Berkovic et al., 2012; Nasrollahi et al., 2017; Nikolopoulou, 2011).

In practice, the analysis of the thermal conditions of courtyards suggests which factors designers should focus on if they aim to achieve the highest possible thermal comfort in courtyards, and the extent of impact of each factor. This has not been done by previous studies. The most important factor that designers need to consider is the insolation level. This factor is of significant impact on MRT, which has a significant influence on the thermal sensation of occupants. Designers cannot affect air temperature and air velocity by manipulating courtyard geometry. To make a difference in these two factors, designers need to work on other aspects. Exploring previous literature shows that other environmental elements can be used to support the environmental performance of courtyards. This may include, for instance, the use of a wind-catcher to support natural ventilation or planting and water elements to reduce air temperature through evaporative cooling. Otherwise, designers can incorporate active environmental strategies, such as using mechanical heating and cooling systems to improve the thermal conditions of courtyards.

### 5.4.3. Thermal comfort in courtyards

This study presents the first assessment of thermal comfort in courtyards based on a local adaptive thermal comfort model for Iraq. Previous literature has depended on either international thermal comfort standards or static thermal comfort indices, which both cannot give an accurate assessment of thermal comfort in courtyards. This study determined the thermal comfort limits of Iraqis and investigated the possible thermal conditions of courtyards in the country.

For the climate of Iraq, the results of this study suggest that the courtyard space can be used as a solution to improve the thermal conditions of residential buildings in the country. Courtyards offer a relatively thermally comfortable outdoor space to occupants to use for their domestic activities. In addition, courtyards mitigate outdoor conditions for indoor spaces, preventing them from having to interact with harsher outdoor climatic conditions as is the case of non-courtyard building typologies. In comparison to typical street spaces, courtyards provide warmer environments in winter and colder environments in summer (Section 5.3.2; Figure 5.21). By being shaded and ventilated, comfortable courtyards can be of 5°C to 10°C lower globe temperature than typical street spaces in summer. By blocking outdoor wind, comfortable courtyards can be of 10°C higher globe temperature than typical street spaces in winter. However, three issues need to be considered:

A. Using the thermal advantages of the courtyard space: the main thermal advantage of the courtyard space is related to its ability to offer low MRT that results from being a shaded outdoor space (Figure 5.9). The MRT is found to be the most effective microclimatic factor on globe temperature in courtyards, which represents the actual thermal sensation of people (Figure 5.13). This thermal advantage is affected by the geometric properties of the courtyard space, especially its width/height ratio (Figure 5.10). The difference in this ratio can lead to a difference in globe temperature of up to 20°C in courtyards (Figure 5.15).
B. Managing the limitations of the courtyard space: the possibility of passively manipulating globe temperature in courtyards is limited to the possibilities of affecting MRT through working on their geometric properties. However, this is not the case for the other two effective microclimatic factors on globe temperature, which are air temperature and air velocity. Both of these two microclimatic factors are not affected by the geometric properties of courtyards (Figures 5.8; 5.12).
C. Managing comfort extents in the courtyard space: courtyards cannot totally satisfy the thermal comfort limits of Iraqis around the year. Due to the harsh climate, courtyards, in the best-case scenario found by this study, can offer thermally comfortable conditions during up to 38% of the occupation hours around the year. Around 51% and 11% of the annual occupation hours are hot and cold hours, respectively (Section 5.3.1). On a daily basis, the comfortable hours are during the day time in winter and morning and evening hours in spring and autumn. Courtyards are hot in summer and most of the time in spring and autumn, and they are cold during the evening in winter (Figures 5.18; 5.19; 5.20).

These results are similar to results found by other studies such as (Salman, 2016). Based on these results, it can be concluded that courtyard spaces can be proposed to improve the thermal conditions in residential buildings. They offer a relatively more thermally comfortable environment than the typical street space settings. However, options to support the thermal performance of courtyards need to be explored and used when adopting courtyards in buildings. This may include the use of passive or active environmental design strategies (Figures 3.4; 3.10). These conclusions are based on the results of the thermal comfort survey and the simulation experiments. Although, typically, simulation predictions are not claimed to be totally presenting real conditions, the results of the current study highly reflect the actual thermal conditions and thermal sensation in courtyards in Iraq. The comfort limits were determined based on the survey that included ninety participants from four cities in Iraq. In the simulation experiments, the majority of the effective factors on the thermal conditions of courtyards are implied in the simulation as the simulation model was built depending on two real courtyard houses in Baghdad.

## 5.5. Courtyard multi-family buildings: design examples

Based on the presented results and discussion, this thesis recommends that courtyards can be adopted in Iraq to improve the thermal conditions of residential buildings. To contribute towards solving the housing challenges in the country while capitalizing on their environmental advantages, the thesis suggests also to adopt courtyards within multi-family residential buildings. This section presents two design examples, demonstrating the possibility of using a private courtyard for each flat within multi-family residential buildings. They are not proposed to represent multi-family courtyard buildings in general, but as examples of possible options. Other designs can be developed by architects using the results of this study.

The two designs, based on the results of the simulation experiments, have as low as possible MRT by being designed for high shading levels: the courtyards were designed to be of W/H ratio lower than 1.0. This ratio reduces MRT in courtyards, which is the microclimatic factor that significantly affects the thermal sensation of occupants in courtyards. Air velocity and air temperature were not considered in the design as they are not affected by the geometric properties of courtyards. As a starting point, the research used a modular flat design developed by the Iraqi Ministry of Construction and Housing. This template as then used to develop two courtyard multi-family building designs (Figure 5. 24). The design concept revises the small balconies to form environmental courtyards that can be used to perform domestic activities.

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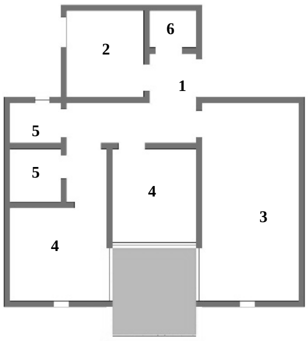
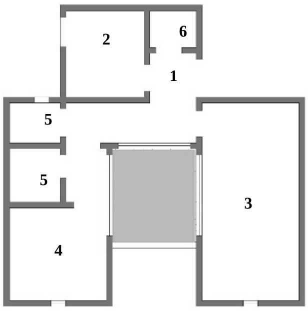
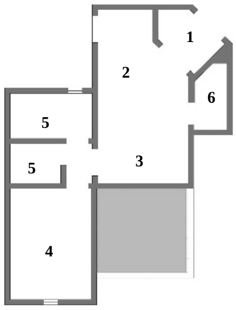
Iraqi Ministry's modular flat



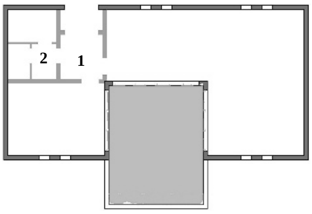

Variant A: 2-bedroom flat



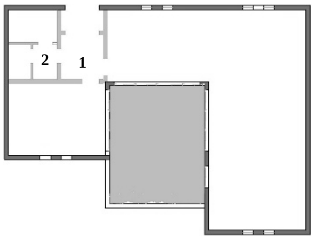

Variant B: 1-bedroom flat



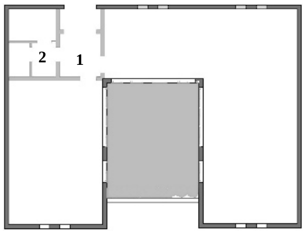

Variant C: 1-bedroom flat




Variant D: 1-bedroom flat – flexible layout




Variant E: 2-bedroom flat – flexible layout




Variant F: 3-bedroom flat – flexible layout

Key: 1.Entrance - 2. Kitchen - 3. Living - 4. Bedroom - 5. Bathroom/WC - 6. Store

General arrangement concept

Figure 5. 24. Design examples - developed courtyard flat variants

### 5.5.1. Multi-family courtyard building - Design A

This design is a three-storey residential building. It contains fifteen courtyard flats. The total floor area is 2100 $m^2$. The concept has courtyards stacked and alternately shifted so that at least double- floor height is provided for each courtyard space (Figure 5. 25). From the generic 360 examined courtyard configurations, variations of the 5.0×6.0×7.0 courtyard option were used. The W/H ratio of this courtyard is 0.7, providing a high shading level. This courtyard option was found to be suitable for the flats of this design example, and it offers around 2000 thermally comfortable hours per annum (CTUI = 0.367), which is the among highest possible levels of thermal comfort (Figure 5.17, Appendix F). To further improve the thermal performance, the design includes partially covering the courtyard spaces to increase the shading level, reduce MRT, and, as a result, increase the thermal comfort.

Climatically, for Baghdad climate, Figures 5.26 and 5.27 and Table 5. 8 illustrate the thermal conditions and the potential thermal comfort in the proposed design as obtained through simulations. Figure 5. 26 shows that, due to the differences in their designs and locations in the building, courtyards vary in their shading and MRT conditions. Furthermore, it shows that MRT can be of up to 15°C higher in sunlit areas than in shaded areas. The differences in shading and MRT levels lead to different globe temperatures in the courtyard spaces. Figure 5. 27 and Table 5. 8 show the hourly globe temperature in three east-facing courtyard flats to showcase the potential thermal comfort in the courtyards of the design. It can be seen that these courtyards are comfortable during the daytime in winter, and the evening in spring and autumn. They are cold in the evening in winter. They are hot in summer and most of the daytime in spring and autumn. There are variations in the detailed comfortable and hot/cold hours between courtyards, which result from having different shading levels. There are dramatic changes in the thermal conditions of courtyards, especially in the early morning hours. These changes result from the fact that, as they are in east-facing flats, these courtyards receive the early morning solar radiation. Once they are shaded, the globe temperature drops by up to 20°C, which further illustrates the significant impact of shading and MRT on the thermal sensation of occupants. In comparison to the thermal conditions of a typical street space, Figure 5. 27 shows that all courtyards are warmer in winter during all of the occupation hours. In summer, courtyards are colder during the majority of the occupation hours except the first morning hours, which results from courtyards not being shaded during this these hours.

This illustration shows that, as expected, the proposed courtyard design does totally satisfy the thermal comfort limits of Iraqis. However, in comparison to typical street settings, the courtyards can help to improve the thermal conditions of the building. This design can be developed, or other designs can be proposed to have more thermally efficient courtyards, especially in summer. Passive improvement opportunities can include using wind- catchers and cross ventilation to support air movement in courtyards. Moreover, planting elements can be incorporated to benefit from evaporative cooling.

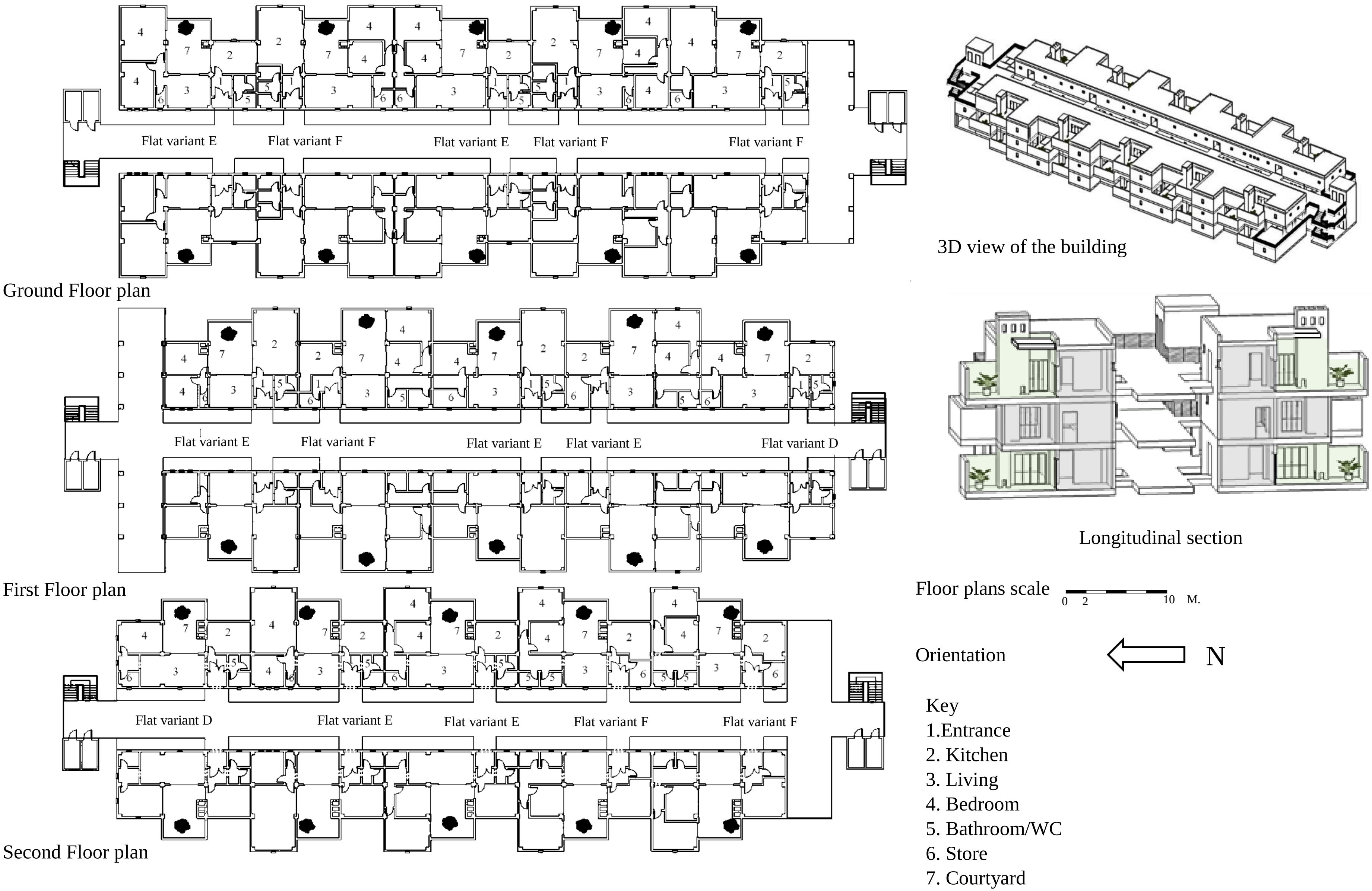



Figure 5. 25. Multi-family courtyard building - Design A

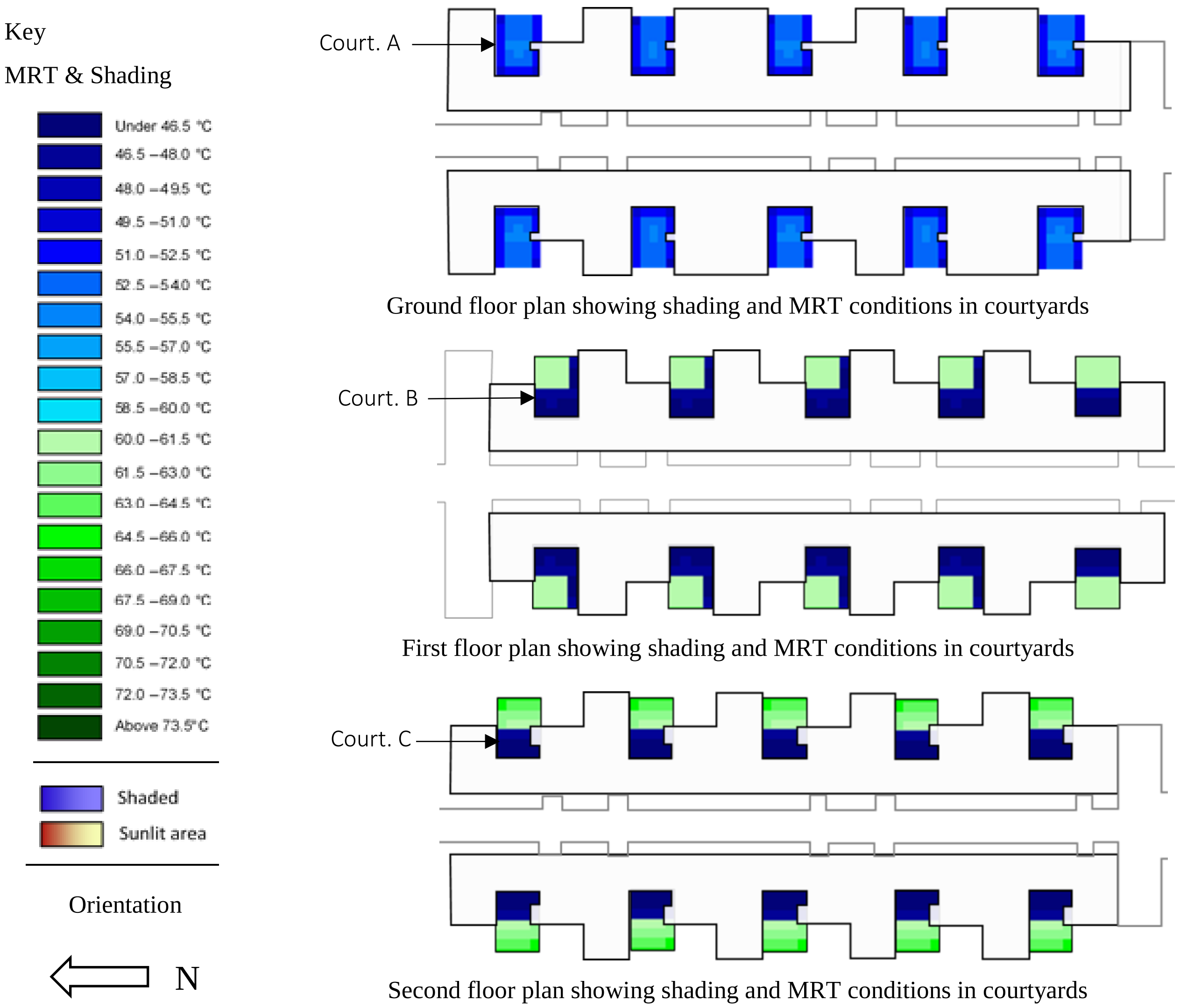



Figure 5. 26. Building Design A: MRT and shading in summer at 12:00PM

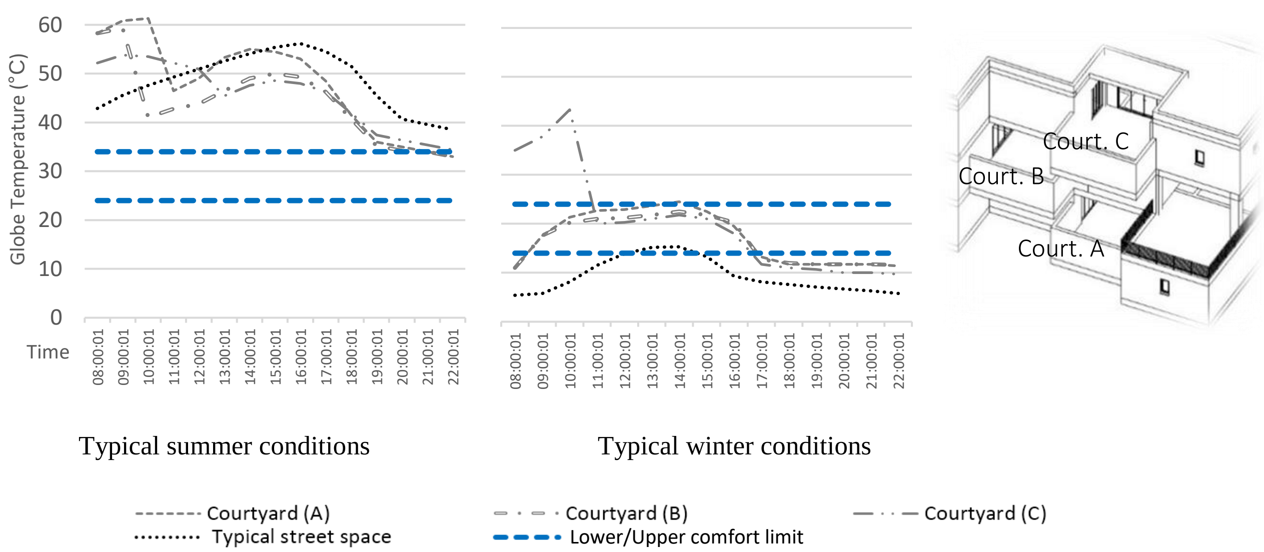



Figure 5. 27. Building Design A: Hourly globe temperature in three-eastern facing courtyards (A;B;C) in comparison to a typical street space

Table 5. 8. Building Design A – Hourly globe temperature in three-eastern facing courtyards (A;B;C) in the four seasons

| Time | Globe temperature (°C) Typical winter conditions | | | | | Globe temperature (°C) Typical spring conditions | | | | | Globe temperature (°C) Typical summer conditions | | | | | Globe temperature (°C) Typical autumn conditions | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | |
| | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit |
| 08:00 | 11.0 | 11.0 | 35.0 | | | 45.3 | 45.3 | 35.1 | | | 58.3 | 58.3 | 52.2 | | | 47.0 | 45.3 | 41.7 | | |
| 09:00 | 17.6 | 17.6 | 37.8 | | | 50.8 | 27.5 | 38.7 | | | 60.8 | 59.3 | 53.8 | | | 51.4 | 31.5 | 44.6 | | |
| 10:00 | 21.3 | 20.2 | 43.3 | | | 30.8 | 29.3 | 39.7 | | | 61.3 | 41.0 | 53.5 | | | 35.8 | 34.1 | 46.1 | | |
| 11:00 | 22.7 | 21.0 | 20.0 | | | 32.5 | 30.3 | 27.6 | | | 46.5 | 42.8 | 52.2 | | | 37.4 | 35.1 | 34.0 | | |
| 12:00 | 22.9 | 21.2 | 20.3 | | | 34.3 | 30.5 | 28.2 | | | 49.0 | 43.8 | 50.9 | | | 39.1 | 35.5 | 34.5 | | |
| 13:00 | 23.7 | 21.8 | 21.0 | | | 35.8 | 32.0 | 28.6 | | | 53.3 | 46.5 | 45.4 | | | 41.5 | 37.7 | 36.9 | | |
| 14:00 | 24.5 | 22.5 | 21.8 | | | 36.8 | 33.8 | 30.1 | | | 55.0 | 49.0 | 47.6 | | | 42.5 | 39.3 | 37.9 | | |
| 15:00 | 22.5 | 21.8 | 21.0 | 14.0 | 24.0 | 36.0 | 33.8 | 30.1 | 17.0 | 27.0 | 54.5 | 50.0 | 48.6 | 24.0 | 34.0 | 42.1 | 39.7 | 38.9 | 21.0 | 31.0 |
| 16:00 | 19.5 | 20.3 | 18.0 | | | 32.8 | 32.0 | 28.6 | | | 53.0 | 49.3 | 48.0 | | | 38.7 | 37.8 | 37.0 | | |
| 17:00 | 13.2 | 12.7 | 11.7 | | | 27.3 | 27.3 | 25.4 | | | 48.5 | 46.3 | 46.3 | | | 32.3 | 32.5 | 32.6 | | |
| 18:00 | 11.7 | 12.0 | 11.0 | | | 19.5 | 19.5 | 20.9 | | | 41.5 | 40.7 | 41.9 | | | 29.2 | 29.1 | 30.1 | | |
| 19:00 | 11.7 | 11.7 | 10.7 | | | 18.7 | 18.7 | 20.5 | | | 36.0 | 35.2 | 37.4 | | | 28.2 | 28.7 | 29.6 | | |
| 20:00 | 11.7 | 11.7 | 10.0 | | | 18.7 | 18.7 | 20.5 | | | 35.0 | 34.2 | 36.4 | | | 28.2 | 28.1 | 29.1 | | |
| 21:00 | 11.7 | 11.7 | 10.0 | | | 18.5 | 17.7 | 19.9 | | | 34.0 | 34.0 | 35.4 | | | 27.2 | 27.7 | 28.6 | | |
| 22:00 | 11.4 | 11.6 | 9.7 | | | 17.7 | 17.7 | 19.5 | | | 33.0 | 33.0 | 34.4 | | | 26.2 | 26.7 | 27.6 | | |

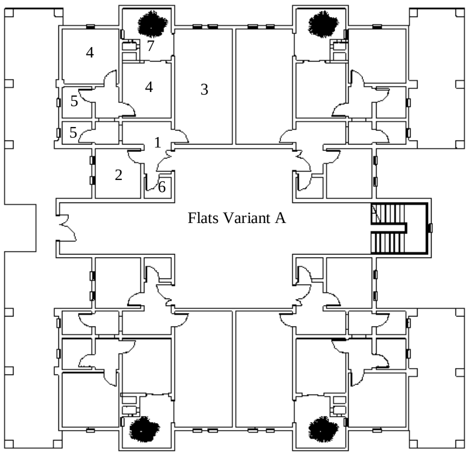
Key: Hot hours; Cold hours; Comfortable hours

### 5.5.2. Multi-family courtyard building - Design B

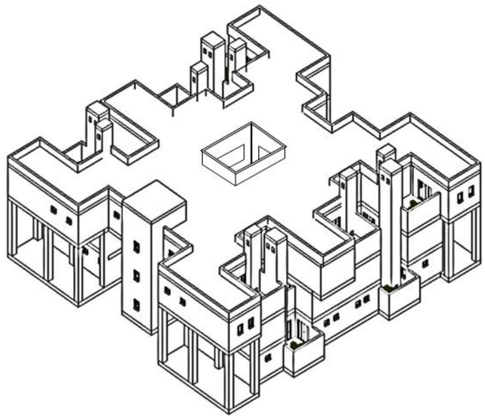
This example is a three-storey residential building. On the ground and first floors, it includes four two-bedroom courtyard flats accessed through a communal circulation spaces. On the second floor, it includes six one-bedroom courtyard flats (Figure 5. 28). In total, the building contains fourteen flats and the ground floor area is 480 $m^2$. As with the Multi-family courtyard Building Design A, the concept employs stacked and alternating courtyards so that double-height is provided for each courtyard space. From the 360 examined courtyards, the selected courtyard option to form the courtyard spaces of this design example is the 3.0×3.0×7.0 option. The W/H ratio of this courtyard is 0.4, and it offers around 2000 thermally comfortable hours around the year (CTUI = 0.372) (Figure 5.17, Appendix F). Courtyards are partially covered to maximize the shading level and minimize the MRT, and, as a result, to offer the highest possible thermal comfort levels to occupants.

Climatically, for Baghdad climate, this design performs in a similar way to Design A. Figures 5.29 and 5.30 and Table 5. 9 illustrate the thermal conditions of its courtyards and the possible extents of thermal comfort that they may offer to occupants based on simulation. Figure 5. 29 shows the impact of shading on the MRT levels in the courtyards. MRT is of up to 15°C higher in sunlit areas in than in shaded areas. The differences in shading and MRT levels in the courtyards affect their globe temperatures. Figure 5. 30 shows the trend of the globe temperature in three east-facing courtyard flats illustrating the potential thermal conditions in the courtyards of the building, and provides a comparison with a typical street space. The impact of shading on their climatic conditions can be seen in the dramatic changes in globe temperature during the morning hours. This is the case in all courtyards, except Courtyard B, which is on the 1st floor, in winter. Due to being more shaded, this courtyard has relatively stable conditions and does not experience the same hot hours in winter as the other two courtyards. In comparison to typical street spaces, Figure 5. 30 shows that courtyards are colder than the typical street space for most of the time in summer, except the first morning hours when the courtyards are not shaded. In winter, the courtyards are warmer than typical street spaces during all of the occupation hours. This thermal performance results from the shading conditions and from having courtyards blocking outdoor wind. Table 5. 9 shows that, throughout the year, these courtyards offer thermal comfort during the daytime in winter and the evening hours in spring and autumn, and for a short time in the morning in spring. They are all cold during the evening in winter. They are all hot during all of the time in summer and most of the daytime in spring and autumn. It can be seen that this building design has some slight differences in comparison to the thermal conditions of Building Design A, and they are both highly similar in regard to the general thermal performance of their courtyards. The differences between the two proposed designs can be traced, primarily, to the impact of the design of the courtyards and building blocks on the resulted shading levels in courtyards.

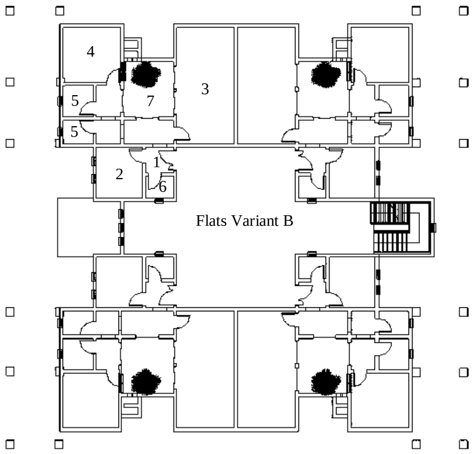
As it is the case with the Building Design A, this design example does not offer totally thermally comfortable environments to occupants in Iraq. However, the proposed courtyards may help to improve the thermal conditions of buildings, as they offer a more thermally comfortable environment than typical street settings. Designers can further develop this design to achieve higher levels of thermal comfort in courtyards through incorporating other environmental elements, such us the wind-catcher, or through using planting and water elements.




Ground floor plan



3D view of the building

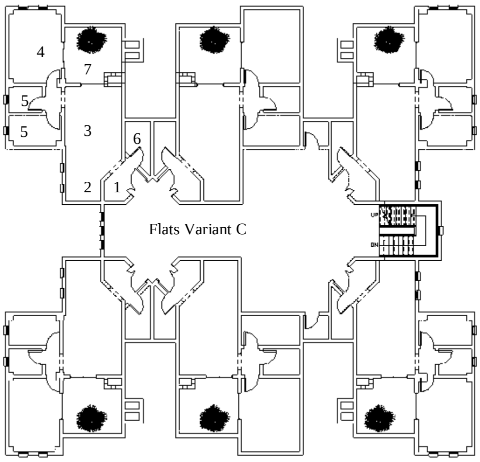



. First floor plan

Longitudinal section

Floor plans Scale 0 2 10 M.

Orientation N




Second floor plan

Key
1.Entrance
2. Kitchen
3. Living
4. Bedroom
5. Bathroom/WC
6. Store
7. Courtyard

Figure 5. 28. Multi-family courtyard building - Design B

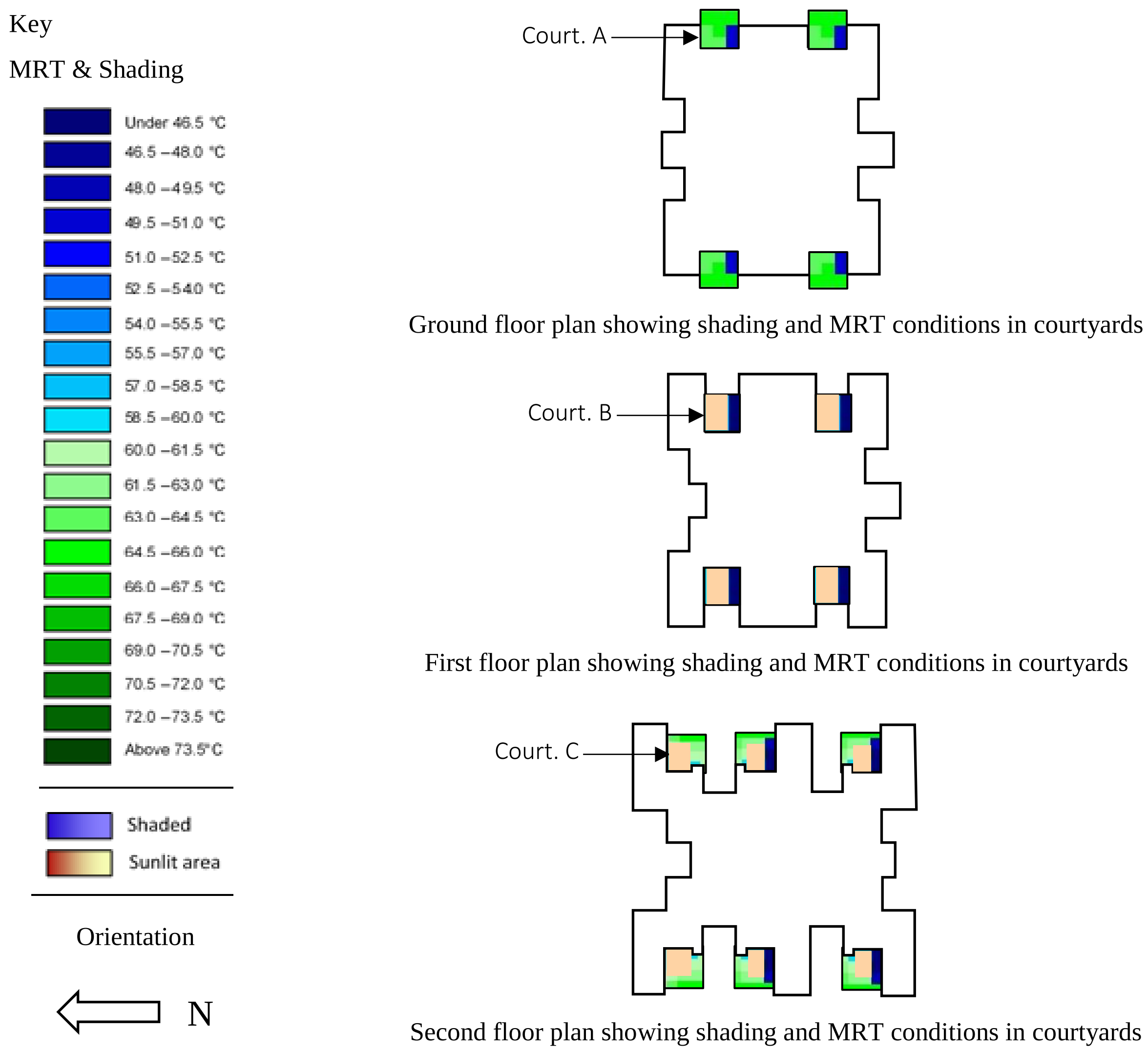



Figure 5. 29. Building Design B: MRT and shading in summer at 12:00PM

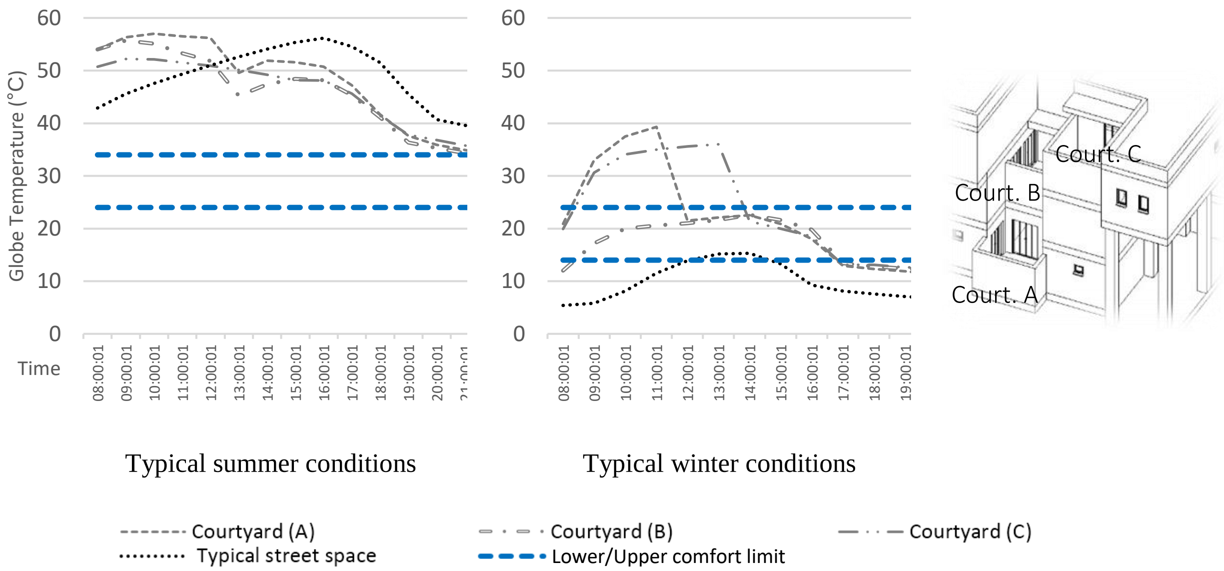



Figure 5. 30. Building Design B: Hourly globe temperature in three-eastern facing courtyards (A;B;C) in comparison to a typical street space

Table 5. 9. Building Design B – Hourly globe temperature in three-eastern facing courtyards (A;B;C) in the four seasons

| Time | Globe temperature (°C) Typical winter conditions | | | | | Globe temperature (°C) Typical spring conditions | | | | | Globe temperature (°C) Typical summer conditions | | | | | Globe temperature (°C) Typical autumn conditions | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | | Courtyards conditions | | | Comfort limits | |
| | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit | GF. courtyards (A) | 1st F. courtyards (B) | 2nd F. courtyards (C) | Lower comfort limit | Upper comfort limit |
| 08:00 | 20.9 | 12.0 | 19.9 | | | 26.2 | 26.2 | 38.8 | | | 54.0 | 54.0 | 50.7 | | | 43.8 | 28.0 | 42.0 | | |
| 09:00 | 33.0 | 17.2 | 30.6 | | | 26.4 | 26.4 | 42.2 | | | 56.3 | 55.7 | 52.2 | | | 48.8 | 31.6 | 46.0 | | |
| 10:00 | 37.5 | 20.0 | 34.1 | | | 29.2 | 28.6 | 43.0 | | | 57.0 | 55.1 | 52.1 | | | 50.4 | 33.6 | 47.0 | | |
| 11:00 | 39.3 | 20.6 | 35.0 | | | 31.3 | 29.4 | 43.3 | | | 56.5 | 53.3 | 51.5 | | | 36.1 | 34.6 | 47.0 | | |
| 12:00 | 21.5 | 21.0 | 35.6 | | | 32.9 | 29.7 | 43.7 | | | 56.2 | 51.8 | 50.9 | | | 37.7 | 35.6 | 47.5 | | |
| 13:00 | 22.1 | 21.6 | 36.0 | | | 33.7 | 31.2 | 29.8 | | | 49.6 | 45.2 | 53.5 | | | 39.9 | 37.1 | 37.0 | | |
| 14:00 | 22.5 | 22.6 | 21.4 | | | 33.3 | 32.7 | 31.2 | | | 51.9 | 47.4 | 50.1 | | | 40.9 | 38.7 | 38.5 | | |
| 15:00 | 20.9 | 21.6 | 20.0 | 14.0 | 24.0 | 30.7 | 32.6 | 31.0 | 17.0 | 27.0 | 51.6 | 48.4 | 49.2 | 24.0 | 34.0 | 40.7 | 39.1 | 39.0 | 21.0 | 31.0 |
| 16:00 | 18.0 | 19.8 | 18.5 | | | 26.7 | 30.6 | 29.3 | | | 50.7 | 48.2 | 48.1 | | | 37.8 | 37.0 | 37.0 | | |
| 17:00 | 12.9 | 13.4 | 13.1 | | | 20.3 | 26.6 | 26.0 | | | 47.2 | 45.3 | 45.6 | | | 32.7 | 32.4 | 32.5 | | |
| 18:00 | 12.3 | 12.8 | 13.1 | | | 20.2 | 20.2 | 21.1 | | | 41.7 | 41.1 | 41.4 | | | 29.9 | 29.8 | 30.0 | | |
| 19:00 | 11.9 | 12.4 | 12.6 | | | 19.4 | 20.0 | 20.4 | | | 37.6 | 36.3 | 37.8 | | | 29.3 | 29.3 | 30.0 | | |
| 20:00 | 11.3 | 12.4 | 12.6 | | | 19.3 | 19.9 | 20.3 | | | 35.9 | 35.3 | 36.8 | | | 28.3 | 28.8 | 29.0 | | |
| 21:00 | 11.3 | 11.8 | 12.1 | | | 19.2 | 19.2 | 20.1 | | | 34.9 | 34.3 | 35.8 | | | 28.3 | 28.8 | 29.0 | | |
| 22:00 | 10.9 | 10.8 | 11.6 | | | 18.4 | 19.1 | 20.0 | | | 33.9 | 33.3 | 34.8 | | | 27.3 | 27.8 | 28.0 | | |

Key: Hot hours; Cold hours; Comfortable hours

## 5.6. Summary of chapter five

This chapter presents the results of the thermal comfort survey and the simulation experiments. The lowest acceptable globe temperature by Iraqis during the coldest time in winter is 14.0°C. The highest acceptable globe temperature during the hottest time of summer is 35.0°C. This applies to mixed-mode ventilation indoor spaces and private outdoor spaces. Regarding courtyards, the simulation results show that all of the explored geometric properties affect the thermal performance of courtyards. However, the dominant property is the W/H ratio. W/L ratio and the orientation have no or limited impact on the thermal conditions of courtyards. The most effective microclimatic factor on the thermal sensation of occupants is MRT, which is affected by the insolation level. The narrower and the higher the courtyards, the less insolation level, the lower MRT and, as a result, the lower globe temperature. The geometric properties explored by this study have no impact on air temperature and air velocity. Regarding the level of thermal comfort in courtyards, the results show that the highest CTUI offered by the examined 360 courtyards ranges between 0.16 and 0.38. In other words, courtyards may offer between 16% to 38% comfortable hours out of the total possible occupation hours per annum. The majority of the uncomfortable hours are hot hours. In comparison to typical street spaces, shaded courtyards can be more thermally comfortable environments. Based on these results, this research suggests that courtyards can help to improve the thermal conditions of buildings, but they do not offer totally thermally comfortable environments. Courtyards need to incorporate other environmental strategies and methods, including using modern air-conditioning systems to have thermally comfortable environments around the year. This chapter ends by presenting two design examples of courtyard multi-family buildings. These two design examples employ two thermally efficient courtyard spaces from the examined 360 courtyard options to illustrate the possibility of using courtyards to develop multi-family buildings in which a private courtyard space is provided for each flat.

# Chapter six ….. Conclusions and Recommendations

# Chapter 6 - Conclusions and Recommendations

This chapter summarises the research described in this thesis and presents final conclusions. It includes the findings of the conducted simulation work and the thermal comfort survey. The chapter phrases the conclusions to provide thermal guidance for adopting courtyards in Iraq. Finally, it presents the future research work suggested on the subjects of thermal comfort and the thermal performance of courtyards.

## 6.1. Summary of conducted research

The aim of this thesis is to determine the thermal efficiency of courtyards for residential buildings in Iraq. However, before investigating the thermal performance of courtyards, the research explored the Iraqi housing context to determine the applicability of the courtyard pattern in the country. Iraq experiences a large housing shortage and a large production shortfall. Apart from that, there are four primary housing challenges which include the scarcity of urban lands and construction materials, inefficient and insufficient infrastructure services provision, and a lack of required financial resources. The mass construction of multi-family buildings has been adopted in the country as a central architectural solution to the housing shortage. To help towards solving the housing problems and capitalizing on their potential environmental advantages, this research suggests adopting courtyard spaces within multi-family residential buildings.

Following the exploration of the housing context, the level of thermal comfort that courtyards can offer to occupants was determined. The Courtyard Thermal Usability Index (CTUI) was developed for this purpose. This index assesses the thermal efficiency of courtyards by determining the ratio of the number of thermally comfortable hours to the total occupation hours in a specific period. To determine CTUI and to achieve its aim, the research had to address two objectives:

- Determining the thermal comfort limits of Iraqis by developing an adaptive thermal comfort model for residential buildings.
- Investigating the possible thermal conditions of courtyards in Iraq.

A thermal comfort survey and a set of simulation experiments using Envi-met 4.2 and IES-VE were conducted. Based on the results of the thermal comfort survey, the research developed an adaptive thermal comfort model for residential buildings in Iraq, which determines the thermal comfort limits of Iraqis around the year. Simulation experiments were used to determine the possible thermal conditions of courtyards in Baghdad around the year. The research used the results of the thermal comfort survey to compute the CTUI, to assess the annual thermal conditions of courtyards studied in the simulation experiments. To provide a comprehensive overview of the potential thermal advantages of courtyards, the research compared the thermal conditions in courtyards with two typical street spaces in Baghdad. The aim of this comparison is to indicate the potential impact of introducing courtyards to buildings. If courtyards are found to be more thermally comfortable than typical street spaces, then the whole courtyard building will be considered more thermally efficient than non-courtyard buildings. The reason is that, in courtyard buildings, indoor spaces interact with mitigated outdoor climatic conditions through the courtyard, which is not the case with non-courtyard buildings.

## 6.2. Findings

1. Applicability of courtyards in Iraq
   - Adopting the courtyard pattern, by its own, does not enable addressing the housing challenges in the country, especially given the large quantitative needs.
   - The mass construction of multi-family housing is the adopted housing construction approach in the country for addressing its housing challenges. Accordingly, to contribute towards addressing the housing challenges and because of their environmental benefits, courtyards are a favourable addition within multi-family buildings
2. Thermal comfort limits of Iraqis
   - In summer, when the running mean outdoor air temperature is 38°C, the upper comfortable globe temperature for Iraqis is 35°C.
   - In winter, when the running mean outdoor air temperature is 8°C, the lower comfortable globe temperature is 14°C.
3. Thermal efficiency of courtyards
   - The geometric properties of courtyards significantly affect their thermal conditions.
   - The thermal sensation of occupants in courtyards, as indicated by the globe temperature, is affected by three microclimatic factors: air temperature, air velocity and MRT. The latter microclimatic factor, is the most dominant one. The difference in MRT can lead to a difference in globe temperature of up to 20°C.
   - The impact of the geometric properties of courtyards is limited to their impact on the insolation level, which significantly affects MRT. The most effective geometric property is the width/height ratio. The deeper the courtyard, the higher the shading level, the lower MRT.
   - The orientation and rectangularity of the courtyard plan are of limited impact on the thermal conditions of courtyards.
   - Air temperature and air velocity are not affected by the geometry of courtyards.
   - Thermally comfortable courtyard spaces can have a globe temperature that is 5°C to 10°C lower than typical street spaces in summer, and 10°C higher than typical street spaces in winter. Accordingly, courtyards offer mitigated outdoor conditions for indoor spaces to interact with instead of directly facing the harsh outdoor climatic conditions, which is the case of non-courtyard buildings.
   - Courtyards can offer thermally comfortable conditions for up to 38% of the total occupation hours per annum. The comfortable hours are in the daytime in winter, and the morning and evening times in spring and autumn.
   - Courtyards cannot completely satisfy the thermal comfort limits of Iraqis. The challenging conditions in courtyards are the hot conditions. In the best-case scenario, these hot conditions represent around 51% of the total occupation hours, which is double the number of cold hours in the worst-case scenario of cold conditions.
   - Courtyards, by blocking the outside wind, may offer a warmer environment than typical street spaces. This is a positive performance in winter, but not in summer. Accordingly, in hot conditions, courtyards may perform negatively if they are not designed to have sufficient natural ventilation, even if they are highly shaded.

## 6.3. Courtyard design guidance

This thesis recommends using courtyards in all housing typologies in Iraq due to their environmental advantages. To achieve thermally efficient courtyards, this research suggests that architects and designers need to manage air temperature, air velocity and MRT in courtyards. When working on these three microclimatic factors, the balance between winter and summer requirements needs to be considered. However, the main focus needs to be on managing the hot conditions. The geometric properties of courtyards significantly affect the thermal conditions of courtyards and the thermal sensation of occupants. To support the design of thermally comfortable environments by manipulating the geometric properties of courtyards , this research suggests the following:

A- MRT

MRT significantly affects the thermal sensation of occupants in courtyards. To manipulate MRT, the shading level in courtyards needs to be considered when defining their geometry.

- The main focus needs to be on the Width/Height ratio as this is the geometric ratio that has the strongest impact on shading levels in courtyards, and the resulted MRT. The lower W/H ratio, the higher the shading level, the lower MRT and the colder the courtyard. As a recommended value, this research suggests not to have W/H ratio higher than 1.0, as this ratio is found in the most thermally comfortable courtyards in the conducted simulation experiments.
- The rectangularity (W/L) and orientation of the courtyard plan do not affect, or have limited impact on, MRT in courtyards.

B- Air temperature

Air temperature significantly affects the thermal sensation of occupants in courtyards. However, it cannot be managed through manipulating the geometric properties of courtyards. Accordingly, other active or passive design strategies need to be adopted. This may include the use of planting and water surfaces in courtyards to activate evaporative cooling or the use of air-conditioning systems.

C- Air velocity

Air velocity is of less impact on the thermal sensation of occupants in comparison to air temperature and MRT. As with air temperature, air velocity cannot be managed through manipulating the geometric properties of courtyards. However, courtyards has lower air velocity than outside, which may lead to having courtyards warmer than outside. Accordingly, in summer, architects and designers may need to consider supplementing the cooling impact of shading by supporting air movement and natural ventilation. This can be done by using mechanical fans, designing for cross ventilation or incorporating wind-catchers.

## 6.4. Research limitations

This research study aimed to determine the thermal efficiency of courtyards in Iraq. Due to typical constraints of time and resources, assumptions were made and research fields and opportunities were left for future studies, as follows:

- The determined thermal comfort limits are based on the conducted survey in four Iraqi cities and for ninety participants. Accordingly, they might not be accurate for cities and regions of high climatic differences comparing with the surveyed cities.
- The main investigation of the thermal efficiency of courtyards was for Baghdad only. Thus, results are applicable to Baghdad and other places with similar climatic conditions. Although results provide an indication of the thermal performance of courtyards in other regions in the country, they are not totally applicable to courtyards in places where high climatic differences are existing comparing to Baghdad.
- This research examined courtyards of different geometric properties, which are found to be of significant impacts on the thermal conditions of courtyards. However, the research did not investigate the environmental impact of other environmental elements of courtyard buildings and the interaction between courtyards and adjacent indoor spaces.
- In examining the thermal conditions of courtyards, the research depended on IES-VE and Envi-met 4.2. These two simulation tools have been validated by previous studies, and the simulation model was calibrated to obtain results that are as close as possible to real-life conditions. However, as is the case with most simulation studies, there might still be a margin of error in the simulation results in comparison to real-life situations.
- In calibrating the simulation model, this research employed two cases and built a simulation model representing actual conditions of courtyards in Iraq. More accurate and representative simulation results could have been obtained by calibrating the model with data from a larger number of real courtyard buildings. This was not possible to be carried out in this study due to the difficulties of surveying courtyards in the country and the limited number of studies that offer in-situ data measurements in courtyard buildings.

## 6.5. Research Recommendations

1. For architects and housing developers
    - Introducing courtyards to housing units in multi-family buildings can help to satisfy a wide range of Iraqis' preferences and can increase the level of the acceptability for the multi-family building pattern. Courtyards can help to offer the required level of privacy, provide private outdoor spaces and improve the thermal conditions of buildings.
    - It has been advocated that courtyards can help to provide thermal comfort for people in hot climate regions. This study confirms that courtyards may offer more thermally comfortable environments than the current typical street settings, but on two conditions. First, courtyards need to be designed with considering their climatic and urban contexts and the environmental impacts of their geometric properties. Otherwise, courtyard buildings may be less thermally efficient than non-courtyard buildings. Second, it must be noted that even in thermally efficient cases, in Baghdad, courtyards are not comfortable during 62% of the occupation hours around the year. Accordingly, architects need to consider exploring possible strategies to support the thermal performance of courtyards, which may include passive and active strategies.
    - Traditional architecture can give useful lessons to develop thermally and energy-efficient buildings.
2. For the general public
    - The courtyard space of traditional buildings had been used for centuries, until the beginning of the 20$^{th}$ century, to provide thermally comfortable residential

environments in Iraq. This element has been replaced with western-style buildings that are, in many aspects, not suitable for the climate of the country. This thesis shows that re-adopting this element can help to offer a more thermally comfortable environment than the currently used western-style patterns. Accordingly, this research recommends exploring the use of the courtyard space when consulting architects and designers regarding constructing future housing projects.

## 6.6. Future research work

This thesis investigated the thermal efficiency of courtyards in Iraq. To further investigate the thermal efficiency of courtyards and thermal comfort, the research suggests the following research fields:

1. Regarding determining the thermal comfort of Iraqis:
   - This research suggests conducting further thermal comfort studies in different places around the country to supplement and improve the proposed adaptive thermal comfort model.
2. Regarding the thermal efficiency of courtyards:
   - Exploring the correlation between the courtyard space and other possible environmental elements and effective factors. This may include exploring the impact of using construction materials of different thermal properties, using water and planting, the wind-catcher or the Shanshol on the thermal conditions of courtyards.
   - Exploring the interaction between the courtyard space and adjacent indoor spaces.
   - Exploring the possible energy saving that can result from using the courtyard space or other environmental elements.
   - Exploring people's preferences and attitudes regarding reusing the courtyard space and other relevant environmental elements in residential buildings to improve the thermal performance of their residential environments.
   - Conducting comparison studies that include compare and contrast the overall thermal performance of courtyard and non-courtyard buildings to further elaborate on the thermal efficiency of courtyards.

## 6.7. Concluding statement

Thermal comfort needs to be considered in the design and construction of the new housing developments in the country. It represents one of the residential priorities of Iraqis. Housing units need to be designed while considering that the highest acceptable globe temperature by Iraqis in summer is 35°C and the lowest in winter is 14 °C. Courtyards, if designed with taking into account the dominant factors, may help to improve the thermal conditions of buildings, but cannot offer totally thermally comfortable environments. Architects and developers are encouraged to use the courtyard space, but with considering having other active or passive design strategies to support the thermal performance of courtyards to ensure thermally comfortable environments to residents around the year.

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# Appendices

# Appendix A: Housing conditions in Iraq

| Year | Housing Production | | | Population | | | | Housing stock | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Housing Shortage | | |
| | Private sector Production [1] | Public sector Production [2] | Total [3] Production | Formation of new households [4] | No. of Households [5] | Household size[6] | Population (000) [7] | Total housing stock (including slums) [8] | Formal housing stock [9] | Overcrowding [10] households/housin | Slums [11] percentage | Quantity shortage[12] | Quality shortage[13] | Estimated [14] Housing Need (historical estimates and |
| 56 | ---- | 2626[a] | 2626 | 10178 | 1014049 | 6.05[a] | 6135[k] | 1956 Housing stock | | | | | | Estimated according to households formation 10000 |
| 57 | ---- | 2896[a] | 2896 | 5614 | 1024227 | 6.15[2] | 6299[n] | | | | | | | 10000 |
| 58 | ---- | 1490[a] | 1490 | 14221 | 1029841 | 6.3[2] | 6488[n] | 766185[p] | 157988[p] | 1.1[p] | 63.3%[o] | 247864 | 856061 | 10000 |
| 59 | ---- | 3028[a] | 3028 | 1276 | 1044062 | 6.4[2] | 6682[n] | | | | | | | 20000 |
| 60 | 12280[a] | 1376[a] | 13656 | 14064 | 1045338 | 6.65[a] | 6885[n] | 1965 Housing stock | | | | | | 20000 |
| 61 | 13170[a] | 1773[a] | 14943 | 1612 | 1059402 | 6.7[2] | 7098[n] | | | | | | | 20000 |
| 62 | 12140[a] | 894[a] | 13034 | 18128 | 1061014 | 6.9[2] | 7321[n] | | | | | | | 30000 |
| 63 | 12830[a] | 250[a] | 13080 | 3913 | 1079142 | 7[2] | 7554[n] | | | | | | | 30000 |
| 64 | 14430[a] | 250[a] | 14680 | 4377 | 1083055 | 7.2[2] | 7798[n] | | | | | | | 30000 |
| 65 | 16370[a] | 86[a] | 16456 | 32112 | 1087432 | 7.4[a] | 8047[k] | 1104452[p] | 475250[p] | 1.2[p] | 56.9%[o] | None | 612182 | 30000 |
| 66 | 18270[a] | 105[a] | 18375 | 28833 | 1115167 | 7.45[2] | 8308[n] | | | | | | | 30000 |
| 67 | 14810[a] | 150[a] | 14960 | 29509 | 1144000 | 7.5[2] | 8580[n] | | | | | | | 56600[a] |
| 68 | 15735[p] | 248[p] | 15983 | 30306 | 1173509 | 7.55[2] | 8860[n] | | | | | | | 56600[a] |
| 69 | 17140[p] | 466[p] | 17388 | 30171 | 1203815 | 7.6[2] | 9149[n] | | | | | | | 56600[a] |
| 70 | 15730[p] | 607[p] | 16337 | 32247 | 1233986 | 7.65[a] | 9440[k] | 1977 Housing stock | | | | | | 138700[a] |
| 71 | 15930[p] | 2055[p] | 17985 | 33637 | 1266233 | 7.7[2] | 9750[k] | | | | | | | 138700[a] |
| 72 | 14363[p] | 2900[p] | 17263 | 35130 | 1299870 | 7.75[2] | 10074[k] | | | | | | | 138700[a] |
| 73 | 14841[p] | 1230[p] | 16071 | 36337 | 1335000 | 7.8[2] | 10413[k] | | | | | | | 138700[a] |
| 74 | 12123[p] | 1605[p] | 13728 | 36764 | 1371337 | 7.85[2] | 10765[k] | | | | | | | 138700[a] |
| 75 | 14816[p] | 1231[p] | 16047 | 57504 | 1408101 | 7.9[a] | 11124[k] | 1461888[p] | 815395[p] | 1.3[p] | 44.2%[o] | 76573 | 723066 | 138700[a] |
| 76 | 17173[p] | 1230[p] | 18403 | 72856 | 1465605 | 7.85[2] | 11505[k] | | | | | | | 138700[a] |
| 77 | | | 46150[p] | 62184 | 1538461 | 7. 8[2] | 12000[k] | | | | | | | 138700[a] |
| 78 | | | 46150[p] | 64419 | 1600645 | 7.75[2] | 12405[k] | | | | | | | 138700[a] |
| 79 | 90183[p] | 94417[p] | 46150[p] | 65393 | 1665064 | 7.7[2] | 12821[k] | | | | | | | 138700[a] |
| 80 | | | 46150[p] | 68095 | 1730457 | 7.65[a] | 13238[k] | 1987 Housing stock | | | | | | 138700[a] |
| 81 | | | 46150[p] | 70322 | 1798552 | 7.6[2] | 13669[k] | | | | | | | 138700[a] |
| 82 | --- | --- | 60000[e] | 75926 | 1868874 | 7.55[2] | 14110[k] | | | | | | | 138700[a] |
| 83 | --- | --- | 60000[e] | 65535 | 1944800 | 7.5[2] | 14586[k] | | | | | | | 138700[a] |
| 84 | --- | --- | 50000[e] | 95746 | 2010335 | 7.45[2] | 14977[k] | | | | | | | 138700[a] |
| 85 | --- | --- | 50000[e] | 56335 | 2106081 | 7.4[i] | 15585[k] | 2031888[4] | 1625510 | 1.2[m] | 10.8%[o] | 160729 | 567107 | 138700[a] |
| 86 | --- | --- | 40000[1] | 30201 | 2162416 | 7.45[2] | 16110[k] | | | | | | | 138700[a] |
| 87 | --- | --- | 10324[w] | 58316 | 2192617 | 7.45[2] | 16335[k] | | | | | | | 138700[a] |
| 88 | --- | --- | 11977[w] | 72800 | 2250933 | 7.5[2] | 16882[k] | | | | | | | 138700[a] |
| 89 | --- | --- | 20571[w] | 45803 | 2323733 | 7.5[2] | 17428[k] | | | | | | | 138700[a] |
| 90 | --- | --- | 15354[w] | 70066 | 2369536 | 7.55[2] | 17890[k] | 1997 housing stock | | | | | | 138700[a] |
| 91 | --- | --- | 6043[w] | 53687 | 2439602 | 7.55[2] | 18419[k] | | | | | | | 169000[g] |
| 92 | --- | --- | 1250[g] | 69605 | 2493289 | 7.6[2] | 18949[k] | | | | | | | 169000[g] |
| 93 | --- | --- | 1250[g] | 52400 | 2562894 | 7.6[2] | 19478[k] | | | | | | | 169000[g] |
| 94 | --- | --- | 1250[g] | 69150 | 2615294 | 7.65[2] | 20007[k] | | | | | | | 169000[g] |
| 95 | --- | --- | 2000[f] | 58932 | 2684444 | 7.65[2] | 20536[k] | 2568592[6] | 2542906 | 1.3[m] | 1%[5] | 294524 | 320210 | 169000[g] |
| 96 | --- | --- | 400[f] | 119740 | 2743376 | 7.7[2] | 21124[k] | | | | | | | 169000[g] |
| 97 | --- | --- | 1000[f] | 85195 | 2863116 | 7.7[i] | 22046[k] | | | | | | | 169000[g] |
| 98 | --- | --- | 1000[f] | 108159 | 2948311 | 7.7[2] | 22702[k] | | | | | | | 169000[g] |
| 99 | --- | --- | 2000[f] | 112740 | 3056470 | 7.65[2] | 23382[k] | | | | | | | 169000[g] |
| 00 | --- | --- | 4000[f] | 112523 | 3169210 | 7.6[2] | 24086[k] | 2007 Housing stock | | | | | | 169000[g] |
| 01 | --- | --- | 15000[q] | 172996 | 3281733 | 7.5[2] | 24813[k] | | | | | | | 169000[g] |
| 02 | 24000[d] | --- | 24000[q] | 153483 | 3454729 | 7.4[2] | 25565[3] | | | | | | | 169000[g] |
| 03 | 53000[d] | --- | 53000 | 161093 | 3608212 | 7.3[2] | 26340[l] | | | | | | | 169000[g] |
| 04 | 8000[d] | --- | 8000[q] | 169145 | 3769305 | 7.2[2] | 27140[l] | 3242220[m] | 3125500 | 1.3 | 3.6%[5] | 1059519 | 1176239 | 169000[g] |
| 05 | 8000[d] | --- | 8000 | 177264 | 3938450 | 7.1[2] | 27963[3] | | | | | | | 169000[g] |
| 06 | 13000[d] | --- | 13000 | 186025 | 4115714 | 7.0[2] | 28810[3] | | | | | | | 200000[v] |
| 07 | 9000[d] | 10283 | 19283[c] | 320724 | 4301739 | 6.9[g] | 29682[l] | | | | | | | 200000[v] |
| 08 | 10000[d] | 12126 | 22126[c] | 103507 | 4622463 | 6.9[2] | 30572[3] | 2011 Housing stock | | | | | | 200000[v] |
| 09 | 11000[d] | 10918 | 21918[c] | 271106 | 4725970 | 6.7[c] | 31664[l] | | | | | | | 200000[v] |
| 10 | 13000[d] | 9805 | 22805[c] | 210736 | 4997076 | 6.5[2] | 32481[l] | | | | | | | 200000[v] |
| 11 | 14000[d] | 9656 | 23656[c] | 233457 | 5207812 | 6.4[c] | 33330[l] | 4717622[u] | 4373236 | 1.3[e] | 7.3%[r] | 490190 | 834576 | 200000[v] |
| 12 | 16000[d] | 12096 | 32196[t] | 224995 | 5429682 | 6.3[2] | 34207[l] | | | | | | | 200000[v] |
| 13 | 11000[d] | 13526 | 22122[t] | 141290 | 5654677 | 6.2[t] | 35059[l] | | | | | | | 200000[v] |
| 14 | --- | --- | 25000[1] | 144839 | 5795967 | 6.2[2] | 35935[3] | | | | | | | 200000[v] |
| 15 | --- | --- | 25000[1] | 148520 | 5940806 | 6.2[2] | 36833[3] | 4845596[4] | 4491867 | 1.2 | 7.3%[5] | 1095210 | 1448939 | 200000[v] |
| 30 | --- | --- | --- | --- | 8440833 | 6.0[2] | 50645[3] | Housing need (2015 – 2030) = 8440833- 4845596- 57270 (Deterioration per year is considered as constant number 3818[S]) | | | | | | 3537967 (Annually 235864) |

Appendix A Key Notes

| | |
|---|---|
| | **Referenced data**<br>(Al-Adhami, 1975)[a]; (Housing Association, 2013)[b]; (Central statistcal organization , 2012)[c] ; (Central statistcal organization (a), 2013)[d]; (Iraqi Ministry of Planning, 2010)[e]; (PADCO, 2006)[f]; (Al-Hamawandi & Al-Qaisi, 2010)[g] ; (Salman, 2007)[i] ; (Salem, 2011)[k] ; (Fayyad, 2012)[l]; (Al-shock, 2008)[m]; (Jan Lahmeye, 2006)[n]; (Yousif, 2012)[o]; (Al-Rahmani, 1986)[p] ; (Shaikley, 2007)[q] ; (Central Statistical Organization (b), 2013)[r]; (Central Statistical Organization, 2005)[s]; (Central Statistical Organization, 2014)[t]; (Central Statistical Organization, 2011)[u] ; (Iraqi Ministry of Construction and Housing, 2010)[v]; (United Nation, 1995)[W] |
| --- | **Data is not available and cannot be estimated** |
| | **Values were estimated depending on calculations based on the available referenced values** |

1. Estimating through formulas :

- Total production = private sector’s production + public sector’s production.
- New households formation = households number in a specific year – households number in the previous year.
- Household size = Total population / No. of households.
- Number of households = total population / household size.
- Formal housing stock = Total stock – slums housing units
- Future deterioration = the estimated number of the annually deteriorated housing units × number of years

2. Estimating by assumptions depending on the available data (only in the following cases);

(1) The total housing production data for the year 1986 and the period 2014 -2015 is not available. The relevant values estimated according to previous and following years.

(2) Household average size. The available data are for 1956, 1965, 1977, 1987, 1997, 2007 and 2011. The other values were estimated with values that represent a bridge between the two identified limitations.

(3) Total population in Iraq: The unavailable values were estimated according to the growth rate of the previous year.

(4) The total housing stock for 1987 was calculated from the summation of 1977 stock with the production of the period 1977-1987. The stock of 2015 was estimated depending on the summation of 2011 stock with the production of the period 2011-2015.

(5) Due to the lack of the available data regarding the slums percentage for the years 1997, 2007 and 2015 the estimation was done according to the following:

- The slums for the year 1997 was estimated building on that slums grown in Baghdad from 25 to 200 between 2003 and 2012 which represented an eight times increase. Accordingly, the percentage of slums of 2011 divided over eight to make an estimate of 1% for the year 1997.
- 3.6% was given to the year 2007, which is a value between 1997 estimated value and 2011 referenced value.
- The same value of 2011 referenced value was given to the year 2015.

(6) The formal census of the year 1997 included only 15 governances and excluded the Kurdistan region. Because of data unavailability, 20% of the census’s value was added to estimate the total housing stock as the share of the Kurdistan region’s housing stock has been typically around that percentage.

# Appendix B: Standard spaces - Iraqi Housing Manual 2010

Single-family and multi-family housing standards – Minimum areas ($m^2$)

| | S1 | S2 | | | | M1 | | | | M2 | | | | L | | | | E1 | | | | E2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Housing unit typology | All-typologies | Detached house | Semi-detached | Row house | Courtyard house | Detached house | Semi-detached | Row house | Courtyard house | Detached house | Semi-detached | Row house | Courtyard house | Detached house | Semi-detached | Row house | Courtyard house | Detached house | Semi-detached | Row house | Courtyard house | Detached house | Semi-detached | Row house | Courtyard house |
| Area ($m^2$) | 150 | 400 - 450 | 300 - 340 | 200 - 260 | 150 - 210 | 420 - 500 | 320 - 360 | 220 - 290 | 170 - 240 | 420 - 500 | 320 - 360 | 220 - 290 | 170 - 240 | 440-550 | 340 - 380 | 240 - 320 | 190 - 270 | 460 - 600 | 360 - 400 | 260 - 350 | 210 - 300 | 460 - 600 | 360 - 400 | 260 - 350 | 210 - 300 |
| Habitable area | 33 | 48 | | 42 | | 63 | | 57 | | 75 | | 69 | | 93 | | 87 | | 108 | | | | 120 | | | |
| Occupancy rate | 1 | 1-3 | | 1-3 | | 3-5 | | 3-5 | | 5-7 | | 5-7 | | 7-9 | | 7-9 | | 9-11 | | | | 11 and more | | | |
| Master bedroom | 13 | 12-21 | | 21 | | 15 | | 15 | | 15 | | 15 | | 15 | | 15 | | 15 | | | | 15 | | | |
| $2^{nd}$ bedroom | -- | 9 | | -- | | 12 | | 12 | | 12 | | 12 | | 12 | | 12 | | 12 | | | | 12 | | | |
| $3^{rd}$ bedroom | -- | --- | | -- | | --- | | -- | | 12 | | 12 | | 12 | | 12 | | 12 | | | | 12 | | | |
| $4^{th}$ bedroom | -- | --- | | -- | | --- | | -- | | --- | | -- | | 12 | | 12 | | 12 | | | | 12 | | | |
| $5^{th}$ bedroom | -- | --- | | -- | | --- | | -- | | --- | | -- | | --- | | -- | | 12 | | | | 12 | | | |
| $6^{th}$ bedroom | -- | --- | | -- | | --- | | -- | | --- | | -- | | --- | | -- | | --- | | | | 12 | | | |
| $1^{st}$ living room | 21 | 18 | | 21 | | 18 | | 24 | | 21 | | 24 | | 24 | | 30 | | 24 | | | | 24 | | | |
| $2^{nd}$ living room | -- | --* | | -- | | 12 | | -- | | 12 | | -- | | 15 | | -- | | 15 | | | | 15 | | | |
| Food preparation | 9 | 9 | | 9 | | 12 | | 12 | | 12 | | 12 | | 15 | | 15 | | 18 | | | | 18 | | | |
| $1^{st}$ bathroom | 4.5 | 4.5 | | 4.5 | | 3.5 | | 3.5 | | 3.5 | | 3.5 | | 4.5 | | 4.5 | | 4.5 | | | | 4.5 | | | |
| $2^{nd}$ bathroom | -- | --- | | -- | | --- | | -- | | --- | | -- | | 3 | | 3 | | 3 | | | | 3 | | | |
| Toilet room | -- | --- | | -- | | 1.5 | | 1.5 | | 1.5 | | 1.5 | | 1.5 | | 1.5 | | 1.5 | | | | 1.5 | | | |
| Storage | 3 | 4.5 | | 4.5 | | 6 | | 6 | | 6 | | 6 | | 7.5 | | 7.5 | | 9 | | | | 9 | | | |
| Circulation space | 6 | 9 | | 9 | | 12 | | 12 | | 15 | | 15 | | 21 | | 18 | | 24 | | | | 27 | | | |
| Outdoor space | 3 | 9 | | 6 | | 15 | | 9-12 | | 21 | | 12-18 | | 27 | | 14-24 | | 33 | | | | 39 | | | |

# Appendix C: Exploring successful housing approaches for Iraq

This paper is published in Habitat International Journal. It presents further elaboration on the conducted research work by this study to investigate the housing situation in Iraq and the adopted housing policy in the country.

Contents lists available at ScienceDirect

Habitat International

journal homepage: www.elsevier.com/locate/habitatint

## Assessing housing approaches for Iraq: Learning from the world experience

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ARTICLE INFO

*Keywords:*
Iraqi housing sector
Housing policies
Housing approaches
Housing shortage
Housing production
Global housing policy

ABSTRACT

Iraq is facing a housing shortage of around 1.0 million housing units, which is equivalent to around 25% of its current housing stock. At the same time, it suffers from having a low housing production. As a first Step towards managing this challenge, the country needs to identify a proper approach to drive developments. For this purpose, a new Iraqi National Housing Policy was issued in 2010. It proposed adopting private sector-led production to handle the housing problems. However, within a context dominated by instability, a negative investment environment, and weak private sector, the Policy's approach has not been applicable. The private sector has not been able to take this role. Accordingly, a comprehensive investigation is required to assess the possible housing approaches and to define a prospective way forward for the country, which has not been found in previous literature. This paper aims to address this challenge by exploring and investigating what has been done by other countries to successfully manage problems similar to those currently faced by Iraq. The research methodology underpinning this paper includes a mathematical extrapolation of data stemming from UN-Habitat housing statistics as well as a wide-ranging literature review. The results demonstrate that supporting the formal private sector-led housing production is a promising principal approach. It has enabled countries to have sustainable housing development. However, due to Iraq's current situation and the inability of its formal sector to satisfy large needs, an interim approach is needed. This should support the public sector intervention and, mainly, adopt informal housing related strategies, such as self-help housing. This is to be done alongside the efforts to support the formal private sector to take its principal role. This research's approach of using a mathematical extrapolation to guide investigating and examining previous literature is highlighted by the research as an innovative approach that has not been adopted by previous studies. It can be used to have a comprehensive investigation of various housing aspects in all countries.

To view the full paper, search the paper title on (www.sciencedirect.com) or use the following website link:

https://www.sciencedirect.com/science/article/pii/S0197397518308737

# Appendix D: Determining Iraqis' residential preferences

## Appendix D.1. Journal paper abstract - A systematic assessment of architectural approaches for solving the housing problem in Iraq

This paper is published in Frontiers of Architectural Research Journal. It presents further elaboration on the conducted research work by this study to investigate the applicability of the courtyard pattern in Iraq. The paper presents the conducted survey study to assess the efficiency of the courtyard pattern and the other available building patterns in satisfying each of the housing requirements and challenges in the country.

Frontiers of Architectural Research (2018) 7, 561–572

Higher Education Press

Available online at www.sciencedirect.com

Frontiers of Architectural Research

www.keaipublishing.com/foar

SOUTHEAST UNIVERSITY

RESEARCH ARTICLE

# A systematic assessment of architectural approaches for solving the housing problem in Iraq

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Received 17 January 2018; received in revised form 24 May 2018; accepted 15 July 2018

KEYWORDS
Housing in Iraq;
Housing patterns;
Construction approaches;
Housing requirements;
Architectural solution

**Abstract**
Iraq experiences housing shortage of around 1-1.5 million units with low production rate. Managing this challenge requires integrated efforts across a number of fields. One way forward is to develop an integral and appropriate architectural solution. In Iraq, it remains unknown which of the possible architectural approaches is adequate to address its housing challenges while considering occupants' preferences. Aiming at helping in forming a solution, this study critically assesses the possible building patterns and construction approaches, which represent the main architectural solutions' framework. To achieve this aim, an extensive literature review was conducted that explores possible alternatives and housing requirements. Alternatives were assessed by comparing and contrasting their adequacy in satisfying Iraqis' preferences and the housing sector requirements. The assessment included conducting two surveys: a public Iraqis survey and an experts survey. The former was used to determine Iraqis' residential priorities and the latter to evaluate the adequacy of the defined alternatives in satisfying a set of housing requirements. A total number of 410 Iraqis participated in the first survey and fourteen Iraqi experts in the second. Based on the results, this paper suggests mass construction of multi-family courtyard residential buildings as a solution and discusses future research efforts.


To view the full paper, please search the paper title on (www.sciencedirect.com) or use the following website link:

https://www.sciencedirect.com/science/article/pii/S2095263518300402

## Appendix D.2. Public survey form (Arabic)

The survey Google form link:

https://docs.google.com/forms/d/e/1FAIpQLSfQh5vSY0J3yiueCAujUTQyr9jm2EwgJ8qyjfy43La6oP0TJg/viewform?usp=pp_url

معلومات حول البحث - اجراء استبيان


اسم الباحث : عمر ارشد الحافظ- طالب دكتوراه - كلية العمارة والتصميم والبيئة في جامعة بليموث/ المملكة المتحدة

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عنوان البحث : مشاكل قطاع الاسكان في العراق

ملخص تعريفي عن البحث :

يود قسم الابنية البيئية في جامعة بليموث ان يدعوكم للمشاركة في دراسة الدكتوراه التي يتم اجراءاها حالياً من قبل الباحث ( عمر ارشد الحافظ). تبحث الدراسة مشاكل قطاع الاسكان في العراق, حيث يقدر العجز السكني الحالي بحوالي 1 الى 1.5 مليون وحدة السكنية وهو ما يمثل تقريباً ربع الرصيد السكني الحالي في البلاد. يمثل البحث محاول للمساهمة في حل المشكلة من الجانب المعماري, حيث يهدف الباحث الى تطوير واقتراح نموذج معماري كفوء في العراق ليتم استخدامه في تصميم وبناء مشاريع الاسكان المستقبلية في البلاد. تتضمن المرحلة الحالية من الدراسة التركيز على تعريف متطلبات العراقيين واولياتهم السكنية والنمط السكني الاكثر كفاءة وملائمة في العراق. وستمثل نتائج المرحلة الحالية من الدراسة الاساس الذي ستيم اعتماده لتصميم النموذج المعماري الاكثر كفاءة و ملائمة.

الصراحة والوضوح :

لقد تم اختياركم للمشاركة في البحث بشكل عشوائي لتمثل فرد ضمن عينة من الشعب العراقي. يرجى من حضرتكم المشاركة في الاستبيان من خلال الاجابة على الاسئلة التالية والتي لاتتطلب الاجابة عليها اكثر من 10 دقائق. يهدف الاستبيان الى التعرف على متطلباتكم والوياتكم السكنية. ستكون جميع اجباتكم قمية ومفيدة في الوصول الى نتائج مفيدة في هذا البحث. تجدر الاشارة هنا الى ان جميع المعلومات التي سيتم الحصول عليها في هذا الاستبيان سيتم استعمالها للاغراض العلمية فقط بما يتضمن ذلك من اكمال دراسة الدكتوراه او نشر بحوث مربتطة بموضوع البحث

الحق في التراجع عن المشاركة البحث:

من المهم الاشارة الى ان مشاركتكم في الدراسة تطوعية. وانه حتى في حالة موافقتكم على المشاركة فانه يجوز لكم ترك بعض الاسئلة والاجابة على بعضها الاخر. في حال عدم رغتبكم الكلية في المشاركة فانه يمكن وببساطة عدم ارسال استمارة الاستبيان هذه ومن دون الحاجة لتبرير ذلك ولا يترتب على ذلك اية عواقب.

موثوقية البحث

لابد من التأكيد على ان الاسئلة الواردة في الاستبيان تركز على ارائكم حول قطاع الاسكان في العراق وانه لن يتم الكشف عن هويات المشاركين في الاستبيان او اي معلومات خاصة بهم. كما انه لا بد من الاشارة الى انه سيتم خزن جميع المعلومات المستحصلة في هذه الدراسة والتعامل معها حسب سياسة جامعة بلي موث في التعامل مع المعلومات المستحصلة في البحوث العلمية

استخلاص نتائج الدراسة

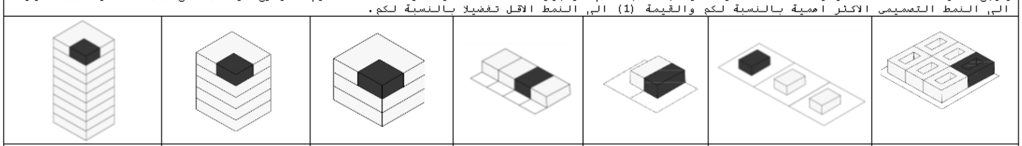
وفيما يخص نتائج الدراسة الحالية, فان الباحث سيقوم بوضع نتائج الدراسة بعد اكتمال جمع المعلومات وتحليلها على صفحته الشخصية على مواقع التواصل الاجتماعي (الفيس بوك) والتي هي بعنوان ( Omar Ar. Sa. Al-Hafith ). كما يمكنكم الاتصال بالباحث في حال كان لديكم اي تساؤل يخص نتائج الدراسة. وفي الختام, اذا كان لديكم اي سؤال او تعليق حول الدراسة بشكلها الكلي او الاستبيان الحالي فيرجى الاتصال بالباحث او بالاستاذ مشرف بشكل مباشر من خلال معلومات الاتصال المذكورة اعلاه .

| الخصائص الاسرية للمشاركين | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| مهنة رب الاسرة ........ | | العدد الكلي لافراد الاسرة | | عدد البالغين من الذكور | | عدد البالغين من الاناث | | عدد الاطفال | |

| خصائص المنطقة السكنية للمشاركين | | | | | |
|---|---|---|---|---|---|
| ما هي طبيعة منطقتك السكنية الحالية ؟ حضرية | | ريفية | | يرجى كتابة اسم المحافظة و الحي السكني الذي تسكنه : (المحافظة ........) - (الحي ........) | |

التفضيلات و المتطلبات السكنية للمشاركين

يرجى تحديد الانماط التصميمية الثلاث الاكثر تفضيلا بالنسبة لكم من بين الانماط التالية من خلال اعطاء قيم تتراوح من (1) الى (3). القمية (3) تشير الى النمط التصميمي الاكثر اهمية بالنسبة لكم والقيمة (1) الى النمط الاقل تفضيلا بالنسبة لكم.



| المسكن ذو الفناء (مسكن شرقي تقليدي) | المساكن المنفصلة | المساكن شبه المنفصلة | المساكن ذات النمط المتصل | شقة ضمن ابنية واطئة الارتفاع (3 طوابق) | شقة ضمن ابنية متوسطة الارتفاع (4-8 طوابق) | شقة ضمن ابنية عالية الارتفاع (فوق 8 طوابق) |
|---|---|---|---|---|---|---|
| | | | | | | |

يرجى تقييم الخصائص السكنية التالية حسب اهميتها بالنسبة لكم من خلال اعطاء قيم تتراوح من (1) الى (10). القمية (10) تشير الى الخاصية السكنية الاكثر اهمية لكم والقيمة (1) الى الخاصية الاقل اهمية بالنسبة لكم.

| كون المسكن آمن انشائيا | توفر خدمات كفوءة وكافية | توفر مساحة كلية كافية | توفير تنظيم ملائم للمساحات الداخلية | توفير امكانية اجراء تحويرات وتعديلات | توفير بيئة داخلية مريحة | كون المسكن ذو شكل خارجي جميل | توفير الخصوصية | كون المسكن اقتصادي في كلفه الابتدائية | كون المسكن اقتصادى فى كلف التشغيل |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

يرجى تحديد اي اسلوب انشائي من الاساليب الانشائية الثلاث التالية يسهل لكم بصورة اكبر الحصول على مسكن ملائم ؟ مع الاخذ بنظر الاعتبار ما هو متوفر في منطقة سكنكم

| | | | | | |
|---|---|---|---|---|---|
| | ابنية سكنية منفردة يتم بناءها من خلال مقاولين ومهندسين وعمال يتم التعاقد معهم ودفع الكلف من قبل اصحاب المساكن | | مساكن منفردة يتم بنائها من خلال جهود ذاتية لسكنة المساكن من دون التعقد من مقاولين او مهندسين او عمال | | مجمعات سكنية كبيرة تضم عدد من الوحدات السكنية يتم بنائها من قبل شركات تابعة للقطاع العام او القطاع الخاص |

في حال كان هناك مشاريع سكنية سيتم بناؤها في العراق من قبل مطورين سكنيين, ما هي برأيك اهم الاعتبارات التي يتوجب عليهم اخذها بنظر الاعتبار اثناء مرحلتي البناء والتصميم؟

..............................................................................

الرجاء ارسال استمارة الاستبيان بعد ملئها الى الباحث من خلال البريد الالكتروني التالي( omar.al-hafith@plymouth.ac.uk ) او من خلال رسالة الى حساب الـ (فيس بوك) (Omar Ar. Sa. Alhafith)
الاستبيان اعلاه متوفر بصورة استبيان الكتروني على الرابط التالي (https://docs.google.com/forms/d/1kZyg7cU2PsXOIzUCnzIv34I6HGptfXL9LTjHehjzoEY/viewform)

# Appendix D.3. Public survey form (English translation)

BUILDING PERFORMANCE ANALYSIS WITH PLYMOUTH UNIVERSITY

**Research Information Sheet – Survey**

**Name of the Investigator:** Omar Arshad Al-Hafith, PhD candidate at Plymouth University.
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**Address:** Roland Levinsky Building 301, School of Architecture, Design and Environment, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA.
**Email:** pieter.dewilde@plymouth.ac.uk

**Title of Research:** The housing sector problems in Iraq

**Brief explanation of the research**

The Environmental Building Group at Plymouth University would like to invite you to participate in a PhD study conducting by the researcher (Omar Al-Hafith). The study is about Iraqi housing sector problems. It is estimated that the current housing shortage in Iraq is around 1 – 1.5 million dwellings, which represents around 25% of the current housing stock. This research aims to contribute to solving this problem architecturally. The researcher will develop a proposal for a suitable and efficient architectural model for future residential projects for the Iraqi context.

The current stage of the research focuses on identifying the residential preferences of Iraqi people and clarifying the most appropriate and efficient housing pattern for Iraq. The results of the current stage will form the basis for the development of an appropriate architectural model as a recommendation for future planning and development.

**Openness and Honesty**

Your selection to participate has been made randomly to represent an element of a sample of Iraqi people. Your answers will be greatly appreciated since they will be very valuable in informing our results. Please, try to answer the following questionnaire which will take around 10 minutes. It aims to take your opinions about issues related to your housing preferences. All the information that you provide will be kept and used by the researcher for scientific purposes only, including the completion of a PhD thesis and academic research publications.

**The right to withdraw**

Your participation in this study is voluntary. Even if you decide to participate in the study, you have the right to refuse to answer some of the questions. You can also totally withdraw simply by not submitting the questionnaire form without giving a reason and without consequences.

**Confidentiality**

The questionnaire questions will focus only on your opinions about the housing sector in Iraq. Your identification information and your identity will not be revealed. All the information that will be collected will be kept and stored according to Plymouth University's related policy.

**Debriefing**

Finally, if you have any comments or questions about the research study or the questionnaire form, please contact the researcher or the research supervisor through their contact details. The researcher will post the results of the study on his personal Facebook page. The researcher's name on Facebook is (Omar Ar. Sa. Alhafith). You can also contact him if you have any inquiries about the results through his contact details.

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The occupants' characteristics: Please, answer the following questions to identify the house's occupants' characteristics.

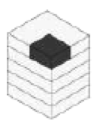
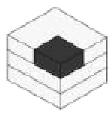
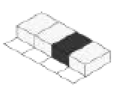
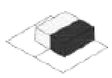
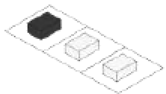
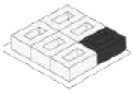
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Adults male number | ☐ | Adults female number | ☐ | Children number | ☐ | Number of occupants | ☐ | Household's head job | .................... |

Your current neighbourhood properties: Please identify your current neighbourhood location and properties

| | | | | | |
|---|---|---|---|---|---|
| Please, Write the name of your current governorate ............................ and Neighbourhood...................... | What is the nature of your current area? | Urban | ☐ | Rural | ☐ |

Your residential requirements: Please, answer the following questions to identify your residential preferences and requirements.

Please, identify your most three preferred housing patterns from the following patterns by giving values from 3 to 1. (The value 3 refers to the most preferred pattern and 1 to the least preferred one).

| | | | | | | |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| A flat within high-rise building (above 8 Stories) | A flat within mid-rise building (4-8 Stories) | A flat within low-rise building (3 Stories) | Row (terrace) house | Semi-detached house | Detached house | courtyard house |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Please, evaluate the following housing features according to their relative importance to you by giving values from 10 to 1. (The value 10 refers to the most important feature and 1 to the least important one)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Having low running costs | Having low initial costs | Providing privacy | Providing aesthetic outside form | Providing suitable indoor environment | Providing flexibility and adaptability | Providing efficient layout arrangement | Providing sufficient spaces | Providing sufficient services | Providing safe structure |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Please, Which of the following construction approaches will facilitate for you getting an adequate house? With considering its costs and what is available in your area.

| | | | | | |
|---|---|---|---|---|---|
| A flat or a house within large housing development to be built by a private investor of a governmental institution | ☐ | A private house to be designed and constructed by yourself and your relatives or friends (without contractors, engineers and paid labours) | ☐ | A private house to be designed and constructed through contractors, engineers and paid labours | ☐ |

If there is a housing development to be built by a private investor or a governmental institution, what do you want them to consider in the project's design and construction?

..........................................................................................................................

..........................................................................................................................

**Please return the questionnaire form to the following email address (omar.al-hafith@plymouth.ac.uk) or through a message to the Facebook account (Omar Ar. Sa. Alhafith)**
**This survey is also available as a web-based survey through the following link:**
**https://docs.google.com/forms/d/1iOfQX4QXlkXfdpPu6c-Purjsh5LGExpbXHe9-Jm_uZQ/viewform**

# Appendix D.4. Experts survey form (Arabic)

معلومات حول البحث – اجراء استبيان


اسم الباحث : عمر ارشد الحافظ- طالب دكتوراه -كلية العمارة والتصميم والبيئة في جامعة بليموث/ المملكة المتحدة

عنوان الباحث: Roland Levinsky Building 301, School of Architecture, Design and Environment, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA

رقم هاتف الباحث: 0044 779 5040 718 – البريد الالكتروني للباحث: omar.al-hafith@plymouth.ac.uk

اسم المشرف : الاستاذ الدكتور بيتر ديويلد

عنوان المشرف: Roland Levinsky Building 301, School of Architecture, Design and Environment, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA

البريد الالكتروني للمشرف: pieter.dewilde@plymouth.ac.uk


عنوان البحث : مشاكل قطاع الاسكان في العراق

ملخص تعريفي عن البحث :

يود قسم الابنية البيئية في جامعة بليموث ان يدعوكم للمشاركة في دراسة الدكتوراه التي يتم اجراءاها حالياً من قبل الباحث ( عمر ارشد الحافظ). تبحث الدراسة مشاكل قطاع الاسكان في العراق, حيث يقدر العجز السكني الحالي بحوالي 1 الى 1.5 مليون وحدة السكنية وهو ما يمثل تقريباً ربع الرصيد السكني الحالي في البلاد. يمثل البحث محاولة للمساهمة في حل المشكلة من الجانب المعماري, حيث يهدف الباحث الى تطوير واقتراح نموذج معماري كفوء ومناسب للسياق العراقي ليتم استخدامه في تصميم وبناء مشاريع الاسكان المستقبلية في البلاد. تتضمن المرحلة الحالية من الدراسة التركيز على تعريف متطلبات العراقيين واولياتهم السكنية والنمط السكني الاكثر كفاءة وملائمة في العراق. وستمثل نتائج المرحلة الحالية من الدراسة الاساس الذي ستيم اعتماده لتصميم النموذج المعماري الاكثر كفاءة .

الصراحة والوضوح :

لقد تم اختياركم للمشاركة في البحث بشكل متعمد بعد ان تم قراءة عدد من بحوثكم المنشورة حول قطاع الاسكان العراقي. يرجى من حضرتكم المشاركة في الاستبيان من خلال الاجابة على الاسئلة التالية والتي لاتتطلب الاجابة عليها أكثر من 15 دقيقة. يهدف الاستبيان الى التعرف على آرائكم الخاصة بالقطاع السكني في العراق بصفتكم خبراء في هذا القطاع. ستكون جميع اجاباتكم قيمة ومفيدة في الوصول الى نتائج مفيدة في هذا البحث. تجدر الاشارة هنا الى ان جميع المعلومات التي سيتم الحصول عليها في هذا الاستبيان سيتم استعمالها للاغراض العلمية فقط بما يتضمن ذلك من أكمال دراسة الدكتوراه او نشر بحوث مرتبطة بموضوع البحث

الحق في التراجع عن المشاركة البحث:

من المهم الاشارة الى ان مشاركتكم في الدراسة تطوعية. وانه حتى في حالة موافقتكم على المشاركة فانه يجوز لكم ترك بعض الاسئلة والاجابة على بعضها الاخر. في حال عدم رغبتكم الكلية في المشاركة فانه يمكن وببساطة عدم ارسال استمارة الاستبيان هذه ومن دون الحاجة لتبرير ذلك ولا يترتب على ذلك اية عواقب.

موثوقية البحث

لابد من التأكيد على ان الاسئلة الواردة في الاستبيان تركز على ارائكم حول قطاع الاسكان في العراق وانه لن يتم الكشف عن هويات المشاركين في الاستبيان او اي معلومات خاصة بهم. كما انه لا بد من الاشارة الى انه سيتم خزن جميع المعلومات المستحصلة في هذه الدراسة والتعامل معها حسب سياسة جامعة بلي موث في التعامل مع المعلومات المستحصلة في البحوث العلمية

استخلاص نتائج الدراسة

وفيما يخص نتائج الدراسة الحالية, فان الباحث سيقوم بوضع نتائج الدراسة بعد اكمال جمع المعلومات وتحليلها على صفحته الشخصية على مواقع التواصل الاجتماعي (الفيس بوك) والتي هي بعنوان ( Omar Ar. Sa. Alhafith). كما يمكنكم الاتصال بالباحث في حال كان لديكم اي تساؤل يخص نتائج الدراسة. وفي الختام, اذا كان لديكم اي سؤال او تعليق حول الدراسة بشكلها الكلي او الاستبيان الحالي فيرجى الاتصال بالباحث او بالاستاذ مشرف بشكل مباشر من خلال معلومات الاتصال المذكورة اعلاه .

**خبراتك العملية**

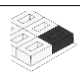
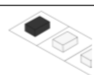
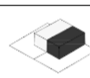
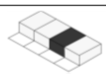
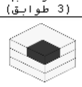
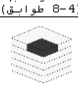
| وظيفتك الحالية | ........ | وظائفك السابقة | ........ | عدد سنوات الخبرة | ☐ |
|---|---|---|---|---|---|

**تلبية متطلبات العراقيين السكنية**

يرجى تقييم الخصائص السكنية التالية حسب اهميتها بالنسبة للعراقيين من خلال اعطاء قيم تتراوح من (1) الى (10). القمية (10) تشير الى الخاصية السكنية الاكثر اهمية للعراقيين والقيمة (1) الى الخاصية الاقل اهمية بالنسبة لهم.

| كون المسكن آمن انشائيا | توفر خدمات كفوءة وكافية | توفر مساحة كلية كافية | توفر غرف كافية وكفوءة | توفير امكانية اجراء تحويرات وتعديلات | توفير بيئة داخلية مريحة | كون المسكن ذو شكل خارجي جميل | توفير الخصوصية | كون المسكن اقتصادى فى كلفه الابتدائية | كون المسكن اقتصادى فى كلف التشغيل |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

يرجى تحديد الانماط التصميمية الثلاث الافضل في العراق في تحقيق متطلبات كل جانب من الجوانب التالية من خلال اعطاء قيم تتراوح بين (1) و (3) . حيث تشير القيمة (3) الى كون النمط المختار هو الاكثر كفاءة في تحقيق متطلبات جانب معين مقارنة بالانماط التصميمية الاخرى

| النمط التصميمي السكني / الجانب او الخاصية السكنية | المسكن ذو الفناء | المساكن المنفصلة | المساكن شبه المنفصلة | المساكن ذات النمط المتصل | ابنية واطئة الارتفاع (3 طوابق) | ابنية متوسطة الارتفاع (4-8 طوابق) | الابنية العالية الارتفاع (فوق 8 طوابق) |
|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |
| كون المسكن آمن انشائيا | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفر خدمات كفوءة وكافية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفر مساحة كلية كافية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفير تنظيم ملائم للمساحات الداخلية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفير امكانية اجراء تحويرات وتعديلات | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفير بيئة داخلية مريحة | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| كون المسكن ذو شكل خارجي جميل | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| توفير الخصوصية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| كون المسكن اقتصادي في كلفه الابتدائية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| كون المسكن اقتصادي في كلف التشغيل | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| زيادة كفاءة انشاء المساكن | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام الارض | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام خدمات البنى التحتية | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام مواد البناء | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**تحقيق الكفاءة في انتاج الوحدات السكنية**

بناءاً على خبرتكم, يرجى تحديد الاسلوب الانشائي الاكثر كفاءة من بين الاساليب المتوفرة في تحقيق كل جانب من الجوانب التالية

| الاسلوب الانشائي / الخصائص السكنية | مجمعات سكنية كبيرة تضم عدد من الوحدات السكنية يتم بنائها من قبل شركات تابعة للقطاع العام او القطاع الخاص | مساكن منفردة يتم بنائها من خلال جهود ذاتية لسكنة المساكن من دون التعقد من مقاولين او مهندسين او عمال | ابنية سكنية منفردة يتم بناءها من خلال مقاولين ومهندسين وعمال يتم التعاقد معهم ودفع الكلف من قبل اصحاب المساكن |
|---|---|---|---|
| كون المسكن آمن انشائيا | ☐ | ☐ | ☐ |
| توفر خدمات كفوءة وكافية | ☐ | ☐ | ☐ |
| توفر مساحة كلية كافية | ☐ | ☐ | ☐ |
| توفير تنظيم ملائم للمساحات الداخلية | ☐ | ☐ | ☐ |
| توفير امكانية اجراء تحويرات وتعديلات | ☐ | ☐ | ☐ |
| توفير بيئة داخلية مريحة | ☐ | ☐ | ☐ |
| كون المسكن ذو شكل خارجي جميل | ☐ | ☐ | ☐ |
| توفير الخصوصية | ☐ | ☐ | ☐ |
| كون المسكن اقتصادي في كلفه الابتدائية | ☐ | ☐ | ☐ |
| كون المسكن اقتصادي في كلف التشغيل | ☐ | ☐ | ☐ |
| زيادة كفاءة انشاء المساكن | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام الارض | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام خدمات البنى التحتية | ☐ | ☐ | ☐ |
| زيادة كفاءة استخدام مواد البناء | ☐ | ☐ | ☐ |

بصورة عامة, هل تعتقد ان استخدام تقنيات الانشاءة الحديثة (مثل تقنيات البناء المصنع) يمكن ان تزيد كفاءة انتاج الوحدات السكنية ام انها غير قابلة للتطبيق في العراق وانه من الافضل الاعتماد على تقنيات البناء المحلية الحالية؟

........................................................................

في حال كان هناك مشاريع سكنية سيتم بناؤها في العراق من قبل مطورين سكنيين, ما هي برأيك اهم الاعتبارات التي يتوجب عليهم اخذها بنظر الاعتبار اثناء مرحلتي البناء والتصميم؟

........................................................................

# Appendix D.5. Experts survey form (English translation)

BUILDING PERFORMANCE ANALYSIS WITH PLYMOUTH UNIVERSITY

**Research Information Sheet – Survey**

**Name of the Investigator:** Omar Arshad Al-Hafith, PhD candidate at Plymouth University.
**Address:** Roland Levinsky Building 301, School of Architecture, Design and Environment, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA.
**Email:** omar.al-hafith@plymouth.ac.uk **Telephone:** +447795040718
**The name of the supervisor**: Professor Pieter De Wilde
**Address:** Roland Levinsky Building 301, School of Architecture, Design and Environment, Plymouth University, Drake Circus, Plymouth, Devon, PL4 8AA.
**Email:** pieter.dewilde@plymouth.ac.uk

**Title of Research:** The housing sector problems in Iraq

**Brief explanation of the research**
The Environmental Building Group at Plymouth University would like to invite you to participate in a PhD study conducting by the researcher (Omar Al-Hafith). The study is about the Iraqi housing sector problems. It is estimated that the current housing shortage is around 1 – 1.5 million dwellings, which represents around 25% of the current housing stock. This research aims to contribute to solving this problem architecturally. The researcher will develop a proposal for a suitable and efficient architectural model for future residential projects for the Iraqi context.
The current stage of the research focuses on identifying the residential preferences of Iraqi people and clarifying the most appropriate and efficient housing pattern for Iraq. The results of the current stage will form the basis for the development of an appropriate architectural model as a recommendation for future planning and development.

**Openness and Honesty**
Your selection for invitation to participate has been made deliberately following the reading some of you research publications about the housing sector in Iraq. Your answers will be greatly appreciated since they will be very valuable in informing our results. Please, try to answer the following questionnaire which will take around 15 minutes. It aims to take your opinions as an expert in the issues that relate to the housing sector in Iraq. All the information that you provide will be kept and used by the researcher for scientific purposes only, including the completion of a PhD thesis and academic research publications.

**The right to withdraw**
Your participation in this study is voluntary. Even if you accept to participate in the study, you have the right to refuse to answer some of the questions. You can also totally withdraw simply by not submitting the questionnaire form, without giving a reason, and without consequences.

**Confidentiality**
The questionnaire questions will focus only on your opinions about the housing sector in Iraq. Your identification information and your identity will not be revealed. All the information that will be collected will be kept and stored according to Plymouth University's related policy.

**Debriefing**
Finally, if you have any comments or questions about the research study or the questionnaire form, please contact the researcher or the research supervisor through their contact details. The researcher will post the results of the study on his personal Facebook page. The researcher's name on Facebook is (Omar Ar. Sa. Alhafith). You can also contact him if you have any inquiries about the results through his contact details.

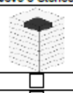
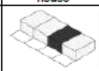
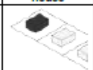
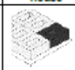
| Your expertise | | | | | |
|---|---|---|---|---|---|
| Your current role | ............ | Your previous roles | ............ | No. of total experience years | ☐ |

Satisfying Iraqi people's residential requirements

Please, evaluate the following housing features for the Iraqi people by giving values from (1) to (10). (The value 5 refers to the most important feature and 1 to the least important one).

| Having low running costs | Having low initial costs | Providing privacy | Providing aesthetic outside form | Providing suitable indoor environment | Providing flexibility and adaptability | Providing efficient layout arrangement | Providing sufficient spaces | Providing sufficient services | Providing safe structure |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Please, identify the first best three patterns from the following architectural patterns by giving values from (1) to (3) according to their efficiency in the following aspects (The value 3 refers to the most efficient pattern).

| | Architectural Patterns / Housing aspects | High-rise building (above 8 Stories) | Mid-rise building (4-8 Stories) | Low-rise building (3 Stories) | Row (terrace) house | Semi-detached house | Detached house | courtyard house |
|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |
| People needs | Having low running costs | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Having low initial costs | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing privacy | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing aesthetic outside form | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing suitable indoor environment | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing flexibility and adaptability | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing efficient layout arrangement | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Providing sufficient spaces | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Housing sector requirements | Increasing housing production rate | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Increasing land use efficiency | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Having efficient use of infrastructure services | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Increasing materials use efficiency | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Having efficient housing production

According to your experience, please select the best construction approaches from the following approaches according to their efficiency in the following aspects

| | Construction approach / Housing aspects | Individual houses constructed by contractors, engineers and labours who are paid by the owners | Individual houses constructed by occupants' self-efforts without paid contractors, labors or engineers. | Large housing developments constructed by a private investor or a governmental institution |
|---|---|---|---|---|
| People needs | Having low running costs | ☐ | ☐ | ☐ |
| | Having low initial costs | ☐ | ☐ | ☐ |
| | Providing privacy | ☐ | ☐ | ☐ |
| | Providing aesthetic outside form | ☐ | ☐ | ☐ |
| | Providing suitable indoor environment | ☐ | ☐ | ☐ |
| | Providing flexibility and adaptability | ☐ | ☐ | ☐ |
| | Providing efficient layout arrangement | ☐ | ☐ | ☐ |
| | Providing sufficient spaces | ☐ | ☐ | ☐ |
| Housing sector requirements | Increasing housing production rate | ☐ | ☐ | ☐ |
| | Increasing land use efficiency | ☐ | ☐ | ☐ |
| | Having efficient use of infrastructure services | ☐ | ☐ | ☐ |
| | Increasing materials use efficiency | ☐ | ☐ | ☐ |

Generally, do you think that the new construction technologies, like the industrial construction technologies, can help to increase housing production efficiency or they are inapplicable in Iraq and it is better to depend on the current conventional construction technologies?

If there is a housing development to be built by developers, what do you think they have to consider for the design and the construction of the project?

**Please return the questionnaire form to the following email address: omar.al-hafith@plymouth.ac.uk.**

## Appendix E: Calibrated courtyard houses in Baghdad

| House A | House B |
|---|---|
| Sourcr: Al-Azzawi, 1984 | Source: Salman, 2016 |

Plans have been removed due to Copyright restrictions.

| | |
|---|---|
| Roof plan | Roof plan |

Plans have been removed due to Copyright restrictions.

| | |
|---|---|
| First floor plan | First floor plan |

Plans have been removed due to Copyright restrictions.

| | |
|---|---|
| Ground floor plan | Ground floor plan |

# Appendix F: Thermal conditions and thermal comfort in courtyards

| o. | Dimension (m) orientation | | | | Thermal conditions at 12:00. Inso. = Insolation level (%), Av =Air velocity (m/s), Ta =Air temperature (°C), MRT = Mean Radiant Temperature (°C), Tg = Globe Temperature (°C), W=Width, L=Length, H=Height, Orien= Long axis orientation angle with north | | | | | | | | | | | | | | | | | | | | Thermal comfort No. of hours - year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Winter | | | | | Spring | | | | | Summer | | | | | Autumn | | | | | | | |
| | W | L | H | Orien | Inso. | Av | Ta | MRT | Tg | Inso. | Av | Ta | MRT | Tg | Inso. | Av | Ta | MRT | Tg | Inso. | Av | Ta | MRT | Tg | Comfort | Cold | Hot |
| 1 | 10 | 10 | 10 | 90 | 20.34 | 0.16 | 10.00 | 21.89 | 16.13 | 27.42 | 0.13 | 26.46 | 41.40 | 34.55 | 44.80 | 0.06 | 41.32 | 73.08 | 61.48 | 32.68 | 0.12 | 33.83 | 47.36 | 41.29 | 1996 | 531 | 2947 |
| 2 | 9 | 11 | 10 | 90 | 18.84 | 0.13 | 10.06 | 21.89 | 16.46 | 25.78 | 0.15 | 26.46 | 41.40 | 34.28 | 44.74 | 0.08 | 41.31 | 73.08 | 60.39 | 30.86 | 0.14 | 33.86 | 47.36 | 41.04 | 2009 | 541 | 2924 |
| 3 | 7 | 14 | 10 | 90 | 15.38 | 0.14 | 10.02 | 21.88 | 16.33 | 21.28 | 0.23 | 26.36 | 41.23 | 33.35 | 43.98 | 0.12 | 41.29 | 72.65 | 58.58 | 25.54 | 0.21 | 33.82 | 47.16 | 40.24 | 2021 | 580 | 2873 |
| 4 | 6 | 17 | 10 | 90 | 13.48 | 0.13 | 10.08 | 21.73 | 16.39 | 18.74 | 0.13 | 26.29 | 40.97 | 34.24 | 43.26 | 0.08 | 41.09 | 72.22 | 59.79 | 22.32 | 0.15 | 33.64 | 46.91 | 40.59 | 2033 | 602 | 2839 |
| 5 | 3 | 32 | 10 | 90 | 7.06 | 0.16 | 9.98 | 19.96 | 15.12 | 9.92 | 0.07 | 26.20 | 37.32 | 33.06 | 32.96 | 0.21 | 40.63 | 52.23 | 46.22 | 11.64 | 0.37 | 33.40 | 41.46 | 36.72 | 2046 | 673 | 2755 |
| 6 | 10 | 10 | 7 | 90 | 31.68 | 0.14 | 9.95 | 22.56 | 16.66 | 30.50 | 0.13 | 26.42 | 66.31 | 48.01 | 49.10 | 0.13 | 40.72 | 70.21 | 56.68 | 39.98 | 0.13 | 33.79 | 71.08 | 53.98 | 1928 | 361 | 3185 |
| 7 | 9 | 11 | 7 | 90 | 26.82 | 0.10 | 10.05 | 22.59 | 17.24 | 34.26 | 0.14 | 26.45 | 66.33 | 47.67 | 49.04 | 0.14 | 40.71 | 70.21 | 56.41 | 38.72 | 0.13 | 33.84 | 71.09 | 54.00 | 1931 | 393 | 3150 |
| 8 | 7 | 14 | 7 | 90 | 21.98 | 0.09 | 10.07 | 22.62 | 17.43 | 30.08 | 0.18 | 26.41 | 42.08 | 34.26 | 48.52 | 0.20 | 40.73 | 70.00 | 55.00 | 34.72 | 0.15 | 33.86 | 48.40 | 41.47 | 1979 | 450 | 3045 |
| 9 | 6 | 17 | 7 | 90 | 19.24 | 0.06 | 10.12 | 22.66 | 18.08 | 26.78 | 0.04 | 26.31 | 41.94 | 36.94 | 47.96 | 0.19 | 40.69 | 69.60 | 54.97 | 31.48 | 0.04 | 33.74 | 48.22 | 43.59 | 2007 | 481 | 2986 |
| 10 | 3 | 32 | 7 | 90 | 10.00 | 0.42 | 9.98 | 20.33 | 14.08 | 14.00 | 0.34 | 26.31 | 38.58 | 31.49 | 40.48 | 0.34 | 41.53 | 70.43 | 53.72 | 16.48 | 0.29 | 33.71 | 44.21 | 38.34 | 2034 | 602 | 2838 |
| 11 | 10 | 10 | 4 | 90 | 40.58 | 0.08 | 10.00 | 54.81 | 36.92 | 45.08 | 0.06 | 26.45 | 65.94 | 51.51 | 53.68 | 0.16 | 40.72 | 70.97 | 56.31 | 48.14 | 0.13 | 33.79 | 71.08 | 53.98 | 1482 | 132 | 3860 |
| 12 | 9 | 11 | 4 | 90 | 41.48 | 0.09 | 10.09 | 54.81 | 36.32 | 44.38 | 0.05 | 26.50 | 65.94 | 52.35 | 53.66 | 0.17 | 40.71 | 70.97 | 56.08 | 47.42 | 0.13 | 33.84 | 71.09 | 54.00 | 1585 | 148 | 3741 |
| 13 | 7 | 14 | 4 | 90 | 35.82 | 0.14 | 10.08 | 55.02 | 33.99 | 41.98 | 0.04 | 26.49 | 65.93 | 53.32 | 53.34 | 0.21 | 40.73 | 70.77 | 55.19 | 45.90 | 0.15 | 33.86 | 48.40 | 41.47 | 1755 | 214 | 3505 |
| 14 | 6 | 17 | 4 | 90 | 32.90 | 0.35 | 10.16 | 55.27 | 29.03 | 40.00 | 0.31 | 26.23 | 65.96 | 43.44 | 53.02 | 0.13 | 40.67 | 70.38 | 56.75 | 43.26 | 0.04 | 33.74 | 48.22 | 43.59 | 1826 | 269 | 3379 |
| 15 | 3 | 32 | 4 | 90 | 17.48 | 0.75 | 10.36 | 21.37 | 13.99 | 24.52 | 0.74 | 26.64 | 40.41 | 31.20 | 48.70 | 0.10 | 40.84 | 54.92 | 48.92 | 28.82 | 0.07 | 33.64 | 43.95 | 40.00 | 1973 | 435 | 3066 |
| 16 | 10 | 10 | 10 | 135 | 20.34 | 0.08 | 9.86 | 22.42 | 17.40 | 27.70 | 0.08 | 26.28 | 65.84 | 50.04 | 47.60 | 0.03 | 40.80 | 74.00 | 64.40 | 32.36 | 0.06 | 33.75 | 46.03 | 41.54 | 1996 | 531 | 2947 |
| 17 | 9 | 11 | 10 | 135 | 21.58 | 0.07 | 10.01 | 22.42 | 17.66 | 29.32 | 0.10 | 26.34 | 65.84 | 49.00 | 48.56 | 0.02 | 40.92 | 74.00 | 65.75 | 33.34 | 0.07 | 33.83 | 46.03 | 41.35 | 2009 | 541 | 2924 |
| 18 | 7 | 14 | 10 | 135 | 23.86 | 0.07 | 10.16 | 22.44 | 17.73 | 32.04 | 0.13 | 26.51 | 41.46 | 34.60 | 50.64 | 0.03 | 41.24 | 73.55 | 64.20 | 34.50 | 0.13 | 33.93 | 45.90 | 40.41 | 2021 | 580 | 2873 |
| 19 | 6 | 17 | 10 | 135 | 24.36 | 0.02 | 9.88 | 22.31 | 19.21 | 33.14 | 0.13 | 26.46 | 41.21 | 34.44 | 51.98 | 0.03 | 41.02 | 73.09 | 63.81 | 34.62 | 0.16 | 33.89 | 45.69 | 39.97 | 2033 | 602 | 2839 |
| 20 | 3 | 32 | 10 | 135 | 16.02 | 0.01 | 10.00 | 21.53 | 19.34 | 25.96 | 0.02 | 26.38 | 38.05 | 35.14 | 53.36 | 0.01 | 41.04 | 69.93 | 64.43 | 24.66 | 0.25 | 33.59 | 42.26 | 37.58 | 2046 | 673 | 2755 |
| 21 | 10 | 10 | 7 | 135 | 28.74 | 0.05 | 9.86 | 56.42 | 40.38 | 36.16 | 0.06 | 26.14 | 66.22 | 51.58 | 51.32 | 0.02 | 40.90 | 74.34 | 66.00 | 39.64 | 0.12 | 33.60 | 70.91 | 54.17 | 1928 | 361 | 3185 |
| 22 | 9 | 11 | 7 | 135 | 30.04 | 0.06 | 10.06 | 56.45 | 39.50 | 37.30 | 0.06 | 26.23 | 66.24 | 51.62 | 52.02 | 0.02 | 41.04 | 74.34 | 66.03 | 40.30 | 0.14 | 33.69 | 70.92 | 53.50 | 1931 | 393 | 3150 |
| 23 | 7 | 14 | 7 | 135 | 31.86 | 0.07 | 10.29 | 24.22 | 18.88 | 39.18 | 0.08 | 26.42 | 66.10 | 50.26 | 53.46 | 0.01 | 41.37 | 73.91 | 67.72 | 41.10 | 0.15 | 33.88 | 70.78 | 53.20 | 1979 | 450 | 3045 |
| 24 | 6 | 17 | 7 | 135 | 32.34 | 0.03 | 9.90 | 24.32 | 20.15 | 40.02 | 0.06 | 26.33 | 65.98 | 51.49 | 54.36 | 0.01 | 41.14 | 73.50 | 67.34 | 41.26 | 0.15 | 33.79 | 48.03 | 41.24 | 2007 | 481 | 2986 |
| 25 | 3 | 32 | 7 | 135 | 22.64 | 0.00 | 9.93 | 22.31 | 22.31 | 34.62 | 0.23 | 26.38 | 39.15 | 32.38 | 55.64 | 0.10 | 41.14 | 70.63 | 58.06 | 33.64 | 0.13 | 33.82 | 45.14 | 39.95 | 2034 | 602 | 2838 |
| 26 | 10 | 10 | 4 | 135 | 40.64 | 0.11 | 9.77 | 55.33 | 35.37 | 45.76 | 0.08 | 26.10 | 65.95 | 50.04 | 55.12 | 0.07 | 40.48 | 71.40 | 59.55 | 47.88 | 0.11 | 33.62 | 70.36 | 54.27 | 1482 | 132 | 3860 |
| 27 | 9 | 11 | 4 | 135 | 41.34 | 0.06 | 10.02 | 55.33 | 38.78 | 47.38 | 0.12 | 26.19 | 65.95 | 48.11 | 54.86 | 0.10 | 40.59 | 71.40 | 58.27 | 48.24 | 0.11 | 33.67 | 70.37 | 54.29 | 1585 | 148 | 3741 |
| 28 | 7 | 14 | 4 | 135 | 42.36 | 0.04 | 10.29 | 55.61 | 41.12 | 47.46 | 0.18 | 26.44 | 65.94 | 46.22 | 56.34 | 0.16 | 40.84 | 71.08 | 56.43 | 48.68 | 0.14 | 33.74 | 47.60 | 41.12 | 1755 | 214 | 3505 |
| 29 | 6 | 17 | 4 | 135 | 26.18 | 0.02 | 9.80 | 55.94 | 44.43 | 30.08 | 0.18 | 26.28 | 65.97 | 46.15 | 37.02 | 0.20 | 40.67 | 70.78 | 55.35 | 31.08 | 0.14 | 33.75 | 47.49 | 41.06 | 1826 | 269 | 3379 |
| 30 | 3 | 32 | 4 | 135 | 36.48 | 0.01 | 9.88 | 23.09 | 20.58 | 44.84 | 0.55 | 26.44 | 65.19 | 40.57 | 57.30 | 0.21 | 41.29 | 71.50 | 55.84 | 44.40 | 0.07 | 33.74 | 44.69 | 40.49 | 1973 | 435 | 3066 |
| 31 | 10 | 10 | 10 | 0 | 20.34 | 0.12 | 10.12 | 22.09 | 16.72 | 27.40 | 0.07 | 26.19 | 41.42 | 35.58 | 44.82 | 0.05 | 40.89 | 72.97 | 61.92 | 32.66 | 0.13 | 33.59 | 47.37 | 41.05 | 1996 | 531 | 2947 |
| 32 | 9 | 11 | 10 | 0 | 21.58 | 0.14 | 10.01 | 22.09 | 16.44 | 28.44 | 0.06 | 26.31 | 41.42 | 35.90 | 42.60 | 0.04 | 41.05 | 72.97 | 62.76 | 33.86 | 0.11 | 33.68 | 47.37 | 41.37 | 2009 | 541 | 2924 |
| 33 | 7 | 14 | 10 | 0 | 23.78 | 0.17 | 9.94 | 22.07 | 16.10 | 29.50 | 0.05 | 26.43 | 65.51 | 52.05 | 43.54 | 0.02 | 41.32 | 72.53 | 64.74 | 35.72 | 0.08 | 33.75 | 69.91 | 55.47 | 2021 | 580 | 2873 |
| 34 | 6 | 17 | 10 | 0 | 24.32 | 0.09 | 9.86 | 21.92 | 16.93 | 29.36 | 0.02 | 26.15 | 65.29 | 55.53 | 41.98 | 0.01 | 40.85 | 72.09 | 66.15 | 36.48 | 0.03 | 33.49 | 69.69 | 59.22 | 2033 | 602 | 2839 |
| 35 | 3 | 32 | 10 | 0 | 15.92 | 0.04 | 10.07 | 53.55 | 39.65 | 18.74 | 0.01 | 26.15 | 62.95 | 55.95 | 29.34 | 0.01 | 40.92 | 68.83 | 63.52 | 29.08 | 0.01 | 33.36 | 66.93 | 60.54 | 2046 | 673 | 2755 |
| 36 | 10 | 10 | 7 | 0 | 28.72 | 0.10 | 10.07 | 22.72 | 17.33 | 35.50 | 0.05 | 26.08 | 65.88 | 52.17 | 49.10 | 0.05 | 41.00 | 73.60 | 62.37 | 39.98 | 0.11 | 33.62 | 46.17 | 40.67 | 1928 | 361 | 3185 |
| 37 | 9 | 11 | 7 | 0 | 30.00 | 0.10 | 9.99 | 22.75 | 17.31 | 36.22 | 0.06 | 26.22 | 65.90 | 51.40 | 48.90 | 0.05 | 41.19 | 73.60 | 62.44 | 40.84 | 0.09 | 33.67 | 46.18 | 41.01 | 1931 | 393 | 3150 |
| 38 | 7 | 14 | 7 | 0 | 31.98 | 0.09 | 9.93 | 55.46 | 36.63 | 36.90 | 0.07 | 26.39 | 65.74 | 50.65 | 47.92 | 0.05 | 41.51 | 73.17 | 62.26 | 45.12 | 0.06 | 33.66 | 46.07 | 41.54 | 1979 | 450 | 3045 |
| 39 | 6 | 17 | 7 | 0 | 32.22 | 0.02 | 9.84 | 55.47 | 44.09 | 36.86 | 0.03 | 26.08 | 65.58 | 54.15 | 47.04 | 0.03 | 40.95 | 72.75 | 63.55 | 124.44 | 0.04 | 33.52 | 68.85 | 57.55 | 2007 | 481 | 2986 |
| 40 | 3 | 32 | 7 | 0 | 22.48 | 0.25 | 9.89 | 54.04 | 30.19 | 26.50 | 0.01 | 26.08 | 63.52 | 56.40 | 37.92 | 0.01 | 41.00 | 69.70 | 64.24 | 37.14 | 0.01 | 33.46 | 67.72 | 61.20 | 2034 | 602 | 2838 |
| 41 | 10 | 10 | 4 | 0 | 40.60 | 0.11 | 10.11 | 54.40 | 35.00 | 45.10 | 0.09 | 26.06 | 65.71 | 49.32 | 53.70 | 0.06 | 41.21 | 74.26 | 62.19 | 48.14 | 0.12 | 33.50 | 69.62 | 53.41 | 1482 | 132 | 3860 |
| 42 | 9 | 11 | 4 | 0 | 41.32 | 0.10 | 10.04 | 54.40 | 35.49 | 45.50 | 0.04 | 26.24 | 65.71 | 53.09 | 53.56 | 0.03 | 41.43 | 74.26 | 64.76 | 48.62 | 0.11 | 33.55 | 69.62 | 53.82 | 1585 | 148 | 3741 |
| 43 | 7 | 14 | 4 | 0 | 42.30 | 0.19 | 10.01 | 54.54 | 32.01 | 45.88 | 0.04 | 26.46 | 65.65 | 53.12 | 53.02 | 0.03 | 41.84 | 73.88 | 64.61 | 49.32 | 0.09 | 33.57 | 69.52 | 54.66 | 1755 | 214 | 3505 |
| 44 | 6 | 17 | 4 | 0 | 42.62 | 0.24 | 9.69 | 54.72 | 30.62 | 45.88 | 0.01 | 26.05 | 65.63 | 58.10 | 52.50 | 0.01 | 41.12 | 73.53 | 67.36 | 49.62 | 0.06 | 33.45 | 69.35 | 56.23 | 1826 | 269 | 3379 |
| 45 | 3 | 32 | 4 | 0 | 36.26 | 0.66 | 9.92 | 53.79 | 25.00 | 44.52 | 0.01 | 26.03 | 64.16 | 56.90 | 47.24 | 0.01 | 41.14 | 71.06 | 65.37 | 46.44 | 0.02 | 33.53 | 68.35 | 59.66 | 1973 | 435 | 3066 |
| 46 | 10 | 10 | 10 | 45 | 20.34 | 0.13 | 10.21 | 23.19 | 17.24 | 27.72 | 0.12 | 26.40 | 41.63 | 34.80 | 47.60 | 0.09 | 40.66 | 69.58 | 57.62 | 32.40 | 0.14 | 33.70 | 46.03 | 40.26 | 1996 | 531 | 2947 |
| 47 | 9 | 11 | 10 | 45 | 18.84 | 0.14 | 10.19 | 23.19 | 17.11 | 25.60 | 0.13 | 26.36 | 41.63 | 34.63 | 46.28 | 0.10 | 40.67 | 69.58 | 57.26 | 28.72 | 0.14 | 33.70 | 46.03 | 40.26 | 2009 | 541 | 2924 |
| 48 | 7 | 14 | 10 | 45 | 15.38 | 0.19 | 10.08 | 23.24 | 16.58 | 20.66 | 0.16 | 26.41 | 41.48 | 34.18 | 42.58 | 0.13 | 40.74 | 69.37 | 56.24 | 25.94 | 0.20 | 33.69 | 45.90 | 39.64 | 2021 | 580 | 2873 |
| 49 | 6 | 17 | 10 | 45 | 13.46 | 0.12 | 9.99 | 23.13 | 17.23 | 18.00 | 0.09 | 26.35 | 41.23 | 35.08 | 39.92 | 0.13 | 40.59 | 68.98 | 55.96 | 22.78 | 0.20 | 33.53 | 45.70 | 39.46 | 2033 | 602 | 2839 |
| 50 | 3 | 32 | 10 | 45 | 7.06 | 0.06 | 9.95 | 21.06 | 17.00 | 9.38 | 0.02 | 26.26 | 37.76 | 34.89 | 22.80 | 0.17 | 40.60 | 52.20 | 46.49 | 12.00 | 0.31 | 33.48 | 42.30 | 37.30 | 2046 | 673 | 2755 |
| 51 | 10 | 10 | 7 | 45 | 28.72 | 0.13 | 10.22 | 23.93 | 17.64 | 36.14 | 0.10 | 26.35 | 66.36 | 49.30 | 51.30 | 0.13 | 40.67 | 70.18 | 56.64 | 39.62 | 0.16 | 33.79 | 70.89 | 52.91 | 1928 | 361 | 3185 |
| 52 | 9 | 11 | 7 | 45 | 26.80 | 0.14 | 10.24 | 23.97 | 17.55 | 34.48 | 0.11 | 26.33 | 66.37 | 48.83 | 50.42 | 0.14 | 40.68 | 70.18 | 56.38 | 38.54 | 0.17 | 33.77 | 70.90 | 52.63 | 1931 | 393 | 3150 |
| 53 | 7 | 14 | 7 | 45 | 21.96 | 0.15 | 10.19 | 24.07 | 17.46 | 29.36 | 0.11 | 26.38 | 66.25 | 48.79 | 47.82 | 0.17 | 40.75 | 69.97 | 55.59 | 34.94 | 0.17 | 33.82 | 70.76 | 52.58 | 1979 | 450 | 3045 |
| 54 | 6 | 17 | 7 | 45 | 19.24 | 0.02 | 10.06 | 24.17 | 20.65 | 25.72 | 0.03 | 26.23 | 66.14 | 54.59 | 45.88 | 0.14 | 40.59 | 69.58 | 56.02 | 31.98 | 0.08 | 33.66 | 70.63 | 55.87 | 2007 | 481 | 2986 |
| 55 | 3 | 32 | 7 | 45 | 9.96 | 0.41 | 9.94 | 21.70 | 14.64 | 13.24 | 0.26 | 26.29 | 39.04 | 32.09 | 31.92 | 0.11 | 40.75 | 53.29 | 47.80 | 16.96 | 0.19 | 33.80 | 45.10 | 39.38 | 2034 | 602 | 2838 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *56* | 10 | 10 | 4 | 45 | 40.60 | 0.04 | 10.31 | 55.42 | 41.00 | 45.74 | 0.08 | 26.40 | 66.05 | 50.22 | 55.10 | 0.15 | 40.66 | 70.90 | 56.49 | 47.84 | 0.08 | 33.87 | 71.11 | 56.24 | 1482 | 132 | 3860 |
| *57* | 9 | 11 | 4 | 45 | 39.48 | 0.03 | 10.36 | 55.42 | 42.38 | 44.78 | 0.07 | 26.36 | 66.05 | 50.83 | 54.62 | 0.16 | 40.67 | 70.90 | 56.25 | 47.22 | 0.07 | 33.85 | 71.11 | 56.83 | 1585 | 148 | 3741 |
| *58* | 7 | 14 | 4 | 45 | 35.84 | 0.11 | 10.29 | 55.72 | 35.82 | 41.84 | 0.13 | 26.41 | 66.07 | 47.88 | 53.10 | 0.16 | 40.74 | 70.70 | 56.18 | 45.14 | 0.13 | 33.93 | 71.05 | 54.02 | 1755 | 214 | 3505 |
| *59* | 6 | 17 | 4 | 45 | 32.86 | 0.38 | 9.99 | 56.06 | 28.80 | 39.50 | 0.22 | 26.12 | 66.11 | 45.14 | 51.98 | 0.11 | 40.57 | 70.32 | 57.29 | 43.46 | 0.27 | 33.64 | 71.03 | 50.47 | 1826 | 269 | 3379 |
| *60* | 3 | 32 | 4 | 45 | 17.46 | 0.89 | 10.33 | 22.34 | 14.06 | 23.18 | 0.59 | 26.51 | 65.40 | 40.37 | 43.98 | 0.07 | 40.76 | 67.78 | 57.42 | 29.62 | 0.03 | 33.67 | 44.90 | 41.65 | 1973 | 435 | 3066 |
| *61* | 9 | 9 | 10 | 90 | 32.82 | 0.09 | 10.03 | 21.88 | 16.98 | 34.90 | 0.07 | 26.33 | 41.15 | 35.47 | 29.32 | 0.04 | 41.02 | 72.44 | 62.39 | 37.56 | 0.07 | 33.72 | 47.06 | 41.95 | 2010 | 543 | 2921 |
| *62* | 8 | 10 | 10 | 90 | 16.80 | 0.07 | 9.93 | 21.95 | 17.34 | 23.00 | 0.08 | 26.31 | 41.24 | 35.28 | 43.12 | 0.05 | 41.01 | 72.56 | 61.69 | 27.98 | 0.08 | 33.72 | 47.14 | 41.78 | 2007 | 566 | 2901 |
| *63* | 7 | 12 | 10 | 90 | 15.18 | 0.14 | 10.03 | 20.54 | 15.62 | 20.96 | 0.16 | 26.42 | 38.86 | 32.83 | 43.14 | 0.12 | 40.69 | 67.95 | 55.72 | 25.28 | 0.15 | 33.67 | 43.27 | 38.70 | 2019 | 580 | 2875 |
| *64* | 5 | 15 | 10 | 90 | 11.26 | 0.09 | 9.87 | 20.39 | 16.04 | 15.68 | 0.12 | 26.20 | 38.35 | 32.90 | 40.38 | 0.14 | 40.68 | 53.96 | 47.75 | 18.64 | 0.19 | 33.54 | 42.64 | 38.04 | 2036 | 612 | 2826 |
| *65* | 2 | 28 | 10 | 90 | 4.68 | 0.05 | 10.14 | 19.50 | 16.28 | 6.56 | 0.13 | 26.21 | 37.32 | 32.22 | 22.34 | 0.26 | 40.61 | 52.23 | 45.90 | 7.72 | 0.38 | 33.40 | 41.46 | 36.69 | 2054 | 665 | 2755 |
| *66* | 9 | 9 | 7 | 90 | 26.12 | 0.07 | 9.94 | 22.93 | 17.95 | 33.26 | 0.06 | 26.25 | 66.30 | 51.67 | 47.82 | 0.08 | 40.60 | 69.37 | 57.88 | 37.98 | 0.06 | 33.66 | 70.97 | 57.34 | 1928 | 400 | 3146 |
| *67* | 8 | 10 | 7 | 90 | 24.00 | 0.07 | 9.84 | 22.87 | 17.87 | 24.56 | 0.07 | 26.23 | 66.30 | 50.94 | 47.80 | 0.10 | 40.61 | 69.69 | 57.29 | 36.42 | 0.07 | 33.66 | 70.99 | 56.68 | 1931 | 422 | 3121 |
| *68* | 7 | 12 | 7 | 90 | 24.80 | 0.12 | 10.10 | 20.57 | 15.87 | 29.68 | 0.15 | 26.46 | 39.75 | 33.42 | 47.80 | 0.13 | 41.49 | 72.68 | 58.37 | 34.40 | 0.22 | 33.88 | 45.68 | 39.49 | 1979 | 446 | 3049 |
| *69* | 5 | 15 | 7 | 90 | 16.08 | 0.04 | 9.83 | 20.44 | 17.05 | 22.38 | 0.04 | 26.33 | 39.32 | 35.17 | 45.82 | 0.04 | 41.26 | 71.90 | 62.10 | 26.64 | 0.09 | 33.79 | 45.16 | 40.46 | 1997 | 530 | 2947 |
| *70* | 2 | 28 | 7 | 90 | 6.68 | 0.30 | 9.99 | 20.09 | 14.41 | 9.38 | 0.12 | 26.35 | 38.58 | 33.09 | 31.52 | 0.16 | 41.49 | 70.43 | 56.41 | 11.00 | 0.05 | 33.74 | 44.21 | 40.60 | 2045 | 614 | 2815 |
| *71* | 9 | 9 | 4 | 90 | 38.66 | 0.07 | 9.90 | 55.13 | 37.79 | 43.50 | 0.03 | 26.26 | 65.93 | 54.45 | 52.82 | 0.10 | 40.61 | 70.14 | 57.55 | 46.78 | 0.06 | 33.66 | 70.97 | 57.34 | 1589 | 152 | 3733 |
| *72* | 8 | 10 | 4 | 90 | 37.24 | 0.08 | 9.79 | 55.08 | 37.00 | 42.62 | 0.07 | 26.25 | 65.93 | 50.72 | 52.80 | 0.11 | 40.61 | 70.46 | 57.39 | 46.48 | 0.07 | 33.66 | 70.99 | 56.68 | 1679 | 176 | 3619 |
| *73* | 7 | 12 | 4 | 90 | 35.46 | 0.07 | 10.20 | 53.63 | 36.98 | 41.50 | 0.03 | 26.55 | 64.90 | 53.81 | 52.80 | 0.18 | 40.73 | 70.16 | 55.47 | 44.74 | 0.23 | 33.76 | 45.38 | 39.22 | 1757 | 214 | 3503 |
| *74* | 5 | 15 | 4 | 90 | 28.16 | 0.20 | 9.85 | 53.95 | 31.35 | 36.38 | 0.28 | 26.31 | 64.92 | 43.52 | 51.64 | 0.13 | 40.69 | 69.41 | 56.24 | 40.10 | 0.16 | 33.70 | 44.91 | 39.48 | 1891 | 318 | 3265 |
| *75* | 2 | 28 | 4 | 90 | 11.70 | 0.66 | 10.22 | 21.82 | 14.21 | 16.42 | 0.55 | 26.66 | 40.41 | 31.67 | 43.38 | 0.09 | 40.83 | 54.92 | 49.09 | 19.28 | 0.16 | 33.64 | 43.95 | 38.95 | 2015 | 487 | 2972 |
| *76* | 9 | 9 | 10 | 135 | 18.32 | 0.07 | 9.97 | 22.46 | 17.67 | 25.02 | 0.09 | 26.44 | 41.39 | 35.21 | 46.06 | 0.02 | 40.99 | 73.32 | 65.26 | 29.98 | 0.05 | 33.89 | 45.61 | 41.57 | 2010 | 543 | 2921 |
| *77* | 8 | 10 | 10 | 135 | 22.06 | 0.07 | 10.16 | 22.53 | 17.79 | 26.44 | 0.11 | 26.51 | 41.48 | 34.92 | 47.28 | 0.02 | 41.27 | 73.45 | 65.42 | 31.10 | 0.06 | 33.94 | 45.77 | 41.45 | 2007 | 566 | 2901 |
| *78* | 7 | 12 | 10 | 135 | 21.64 | 0.06 | 10.25 | 21.78 | 17.57 | 29.66 | 0.11 | 26.45 | 39.46 | 33.76 | 49.10 | 0.03 | 41.13 | 72.61 | 63.50 | 32.70 | 0.09 | 33.81 | 43.88 | 39.72 | 2019 | 580 | 2875 |
| *79* | 5 | 15 | 10 | 135 | 20.90 | 0.04 | 10.29 | 21.76 | 18.09 | 29.90 | 0.14 | 26.50 | 39.00 | 33.15 | 50.64 | 0.04 | 41.45 | 71.69 | 62.02 | 31.28 | 0.15 | 33.74 | 43.32 | 38.76 | 2036 | 612 | 2826 |
| *80* | 2 | 28 | 10 | 135 | 10.78 | 0.01 | 10.18 | 21.33 | 19.21 | 17.56 | 0.04 | 26.38 | 38.05 | 34.32 | 51.88 | 0.01 | 40.99 | 69.93 | 64.42 | 16.56 | 0.22 | 33.60 | 42.26 | 37.72 | 2054 | 665 | 2755 |
| *81* | 9 | 9 | 7 | 135 | 26.14 | 0.05 | 10.04 | 24.62 | 19.60 | 33.88 | 0.07 | 26.31 | 66.19 | 50.90 | 50.18 | 0.02 | 41.12 | 73.75 | 65.61 | 37.64 | 0.14 | 33.76 | 70.81 | 53.47 | 1928 | 400 | 3146 |
| *82* | 8 | 10 | 7 | 135 | 27.68 | 0.07 | 10.27 | 24.53 | 19.06 | 35.24 | 0.09 | 26.40 | 66.20 | 49.74 | 51.06 | 0.01 | 41.42 | 73.85 | 67.68 | 38.44 | 0.17 | 33.85 | 70.83 | 52.63 | 1931 | 422 | 3121 |
| *83* | 7 | 12 | 7 | 135 | 0.00 | 0.07 | 10.24 | 22.09 | 17.55 | 0.00 | 0.07 | 26.40 | 64.75 | 50.05 | 52.32 | 0.02 | 41.29 | 73.16 | 65.21 | 39.62 | 0.15 | 33.84 | 69.30 | 52.40 | 1979 | 446 | 3049 |
| *84* | 5 | 15 | 7 | 135 | 28.88 | 0.04 | 10.41 | 22.11 | 18.37 | 37.24 | 0.08 | 26.44 | 64.41 | 49.25 | 53.38 | 0.01 | 41.66 | 72.29 | 66.46 | 38.48 | 0.15 | 33.93 | 45.94 | 40.22 | 1997 | 530 | 2947 |
| *85* | 2 | 28 | 7 | 135 | 15.38 | 0.01 | 10.08 | 22.41 | 20.06 | 25.10 | 0.15 | 26.38 | 39.15 | 33.07 | 54.24 | 0.06 | 41.09 | 70.63 | 59.84 | 23.66 | 0.03 | 33.80 | 45.14 | 41.86 | 2045 | 614 | 2815 |
| *86* | 9 | 9 | 4 | 135 | 38.68 | 0.07 | 9.99 | 55.75 | 38.21 | 44.20 | 0.05 | 26.28 | 65.94 | 52.28 | 54.38 | 0.05 | 40.64 | 70.92 | 60.49 | 46.50 | 0.11 | 33.73 | 70.07 | 54.15 | 1589 | 152 | 3733 |
| *87* | 8 | 10 | 4 | 135 | 39.56 | 0.03 | 10.34 | 55.68 | 42.56 | 44.96 | 0.06 | 26.42 | 65.94 | 51.50 | 54.84 | 0.06 | 40.79 | 71.00 | 59.96 | 46.94 | 0.13 | 33.77 | 47.52 | 41.21 | 1679 | 176 | 3619 |
| *88* | 7 | 12 | 4 | 135 | 40.84 | 0.02 | 10.28 | 54.43 | 43.42 | 46.14 | 0.11 | 26.40 | 65.23 | 48.22 | 55.58 | 0.04 | 41.47 | 73.63 | 63.35 | 47.64 | 0.12 | 33.73 | 45.95 | 40.47 | 1757 | 214 | 3503 |
| *89* | 5 | 15 | 4 | 135 | 40.10 | 0.05 | 10.44 | 54.92 | 39.60 | 46.04 | 0.18 | 26.45 | 65.25 | 45.88 | 56.20 | 0.11 | 41.89 | 72.91 | 59.32 | 46.92 | 0.13 | 33.79 | 45.54 | 40.15 | 1891 | 318 | 3265 |
| *90* | 2 | 28 | 4 | 135 | 26.96 | 0.02 | 10.01 | 23.95 | 20.47 | 38.66 | 0.45 | 26.38 | 65.19 | 41.44 | 56.66 | 0.15 | 41.23 | 71.50 | 57.08 | 37.70 | 0.03 | 33.74 | 44.69 | 41.52 | 2015 | 487 | 2972 |
| *91* | 9 | 9 | 10 | 0 | 18.30 | 0.07 | 10.01 | 22.08 | 17.45 | 24.86 | 0.06 | 26.32 | 41.13 | 35.72 | 43.20 | 0.04 | 41.00 | 72.31 | 62.30 | 30.18 | 0.10 | 33.71 | 47.02 | 41.35 | 2010 | 543 | 2921 |
| *92* | 8 | 10 | 10 | 0 | 19.52 | 0.09 | 10.18 | 22.15 | 17.20 | 26.10 | 0.06 | 26.52 | 41.22 | 35.85 | 42.82 | 0.03 | 41.28 | 72.43 | 63.42 | 31.66 | 0.09 | 33.85 | 47.10 | 41.62 | 2007 | 566 | 2901 |
| *93* | 7 | 12 | 10 | 0 | 21.60 | 0.15 | 10.00 | 20.72 | 15.61 | 27.70 | 0.05 | 26.41 | 64.26 | 51.22 | 42.42 | 0.02 | 41.26 | 71.52 | 63.97 | 33.72 | 0.07 | 33.73 | 68.49 | 55.16 | 2019 | 580 | 2875 |
| *94* | 5 | 15 | 10 | 0 | 20.80 | 0.14 | 10.14 | 20.57 | 15.69 | 25.56 | 0.02 | 26.42 | 63.83 | 54.50 | 38.76 | 0.01 | 41.40 | 70.59 | 65.04 | 33.30 | 0.05 | 33.68 | 67.95 | 56.15 | 2036 | 612 | 2826 |
| *95* | 2 | 28 | 10 | 0 | 10.70 | 0.10 | 10.24 | 53.22 | 34.90 | 12.56 | 0.01 | 26.19 | 62.95 | 55.96 | 19.50 | 0.00 | 40.96 | 68.83 | 68.83 | 19.66 | 0.01 | 33.41 | 66.93 | 60.55 | 2054 | 665 | 2755 |
| *96* | 9 | 9 | 7 | 0 | 26.01 | 0.05 | 9.95 | 23.06 | 18.54 | 32.98 | 0.06 | 26.23 | 65.79 | 51.34 | 47.82 | 0.05 | 41.10 | 73.00 | 62.01 | 38.00 | 0.08 | 33.72 | 45.66 | 40.89 | 1928 | 400 | 3146 |
| *97* | 8 | 10 | 7 | 0 | 27.66 | 0.07 | 10.13 | 23.01 | 18.07 | 34.12 | 0.07 | 26.47 | 65.81 | 50.73 | 47.56 | 0.05 | 41.43 | 73.10 | 62.19 | 39.00 | 0.08 | 33.78 | 45.88 | 41.05 | 1931 | 422 | 3121 |
| *98* | 7 | 12 | 7 | 0 | 29.74 | 0.11 | 9.96 | 54.28 | 34.87 | 35.32 | 0.06 | 26.39 | 64.66 | 50.68 | 47.30 | 0.04 | 41.45 | 72.28 | 62.42 | 40.48 | 0.11 | 33.81 | 69.21 | 53.70 | 1979 | 446 | 3049 |
| *99* | 5 | 15 | 7 | 0 | 28.78 | 0.05 | 10.15 | 54.16 | 39.00 | 33.56 | 0.04 | 26.44 | 64.25 | 52.16 | 44.68 | 0.02 | 41.62 | 71.39 | 63.96 | 40.06 | 0.07 | 33.82 | 68.69 | 55.32 | 1997 | 530 | 2947 |
| *100* | 2 | 28 | 7 | 0 | 15.28 | 0.12 | 10.12 | 53.82 | 34.21 | 17.94 | 0.01 | 26.13 | 63.52 | 56.41 | 27.86 | 0.00 | 41.05 | 69.70 | 69.70 | 28.10 | 0.01 | 33.51 | 67.72 | 61.21 | 2045 | 614 | 2815 |
| *101* | 9 | 9 | 4 | 0 | 38.68 | 0.08 | 9.86 | 54.61 | 36.74 | 43.50 | 0.06 | 26.23 | 65.62 | 51.23 | 52.80 | 0.04 | 41.31 | 73.69 | 63.34 | 46.78 | 0.10 | 33.58 | 46.27 | 40.86 | 1589 | 152 | 3733 |
| *102* | 8 | 10 | 4 | 0 | 39.50 | 0.08 | 10.14 | 54.58 | 36.84 | 43.96 | 0.02 | 26.50 | 65.64 | 55.88 | 52.66 | 0.01 | 41.71 | 73.78 | 67.68 | 47.34 | 0.11 | 33.64 | 69.39 | 53.73 | 1679 | 176 | 3619 |
| *103* | 7 | 12 | 4 | 0 | 40.78 | 0.09 | 10.07 | 53.44 | 35.51 | 44.72 | 0.02 | 26.43 | 64.89 | 55.30 | 52.50 | 0.02 | 41.77 | 73.40 | 65.51 | 48.20 | 0.05 | 33.92 | 69.63 | 57.33 | 1757 | 214 | 3503 |
| *104* | 5 | 15 | 4 | 0 | 40.00 | 0.28 | 10.26 | 53.59 | 29.57 | 43.60 | 0.05 | 26.56 | 64.66 | 51.54 | 51.00 | 0.04 | 42.01 | 72.61 | 62.83 | 47.90 | 0.07 | 33.99 | 69.20 | 55.70 | 1891 | 318 | 3265 |
| *105* | 2 | 28 | 4 | 0 | 26.76 | 0.52 | 10.01 | 53.82 | 26.27 | 31.00 | 0.01 | 26.09 | 64.16 | 56.92 | 41.14 | 0.01 | 41.21 | 71.06 | 65.38 | 40.74 | 0.02 | 33.59 | 68.35 | 59.68 | 2015 | 487 | 2972 |
| *106* | 9 | 9 | 10 | 45 | 18.32 | 0.06 | 10.11 | 23.28 | 18.47 | 23.10 | 0.07 | 26.36 | 41.41 | 35.64 | 47.52 | 0.07 | 40.60 | 68.74 | 57.95 | 29.96 | 0.11 | 33.65 | 45.62 | 40.38 | 2010 | 543 | 2921 |
| *107* | 8 | 10 | 10 | 45 | 16.78 | 0.07 | 10.04 | 23.35 | 18.25 | 22.78 | 0.09 | 26.55 | 41.50 | 35.32 | 44.50 | 0.08 | 40.73 | 69.06 | 57.75 | 28.06 | 0.11 | 33.77 | 45.78 | 40.52 | 2007 | 566 | 2901 |
| *108* | 7 | 12 | 10 | 45 | 15.18 | 0.16 | 10.09 | 21.41 | 15.93 | 20.46 | 0.14 | 26.37 | 39.19 | 33.19 | 42.48 | 0.10 | 40.67 | 67.92 | 56.30 | 25.58 | 0.13 | 33.69 | 43.88 | 39.21 | 2019 | 580 | 2875 |
| *109* | 5 | 15 | 10 | 45 | 11.26 | 0.12 | 9.97 | 21.35 | 16.24 | 15.04 | 0.13 | 26.59 | 38.73 | 33.16 | 35.82 | 0.13 | 40.82 | 53.94 | 47.92 | 19.06 | 0.19 | 33.69 | 43.34 | 38.46 | 2036 | 612 | 2826 |
| *110* | 2 | 28 | 10 | 45 | 4.68 | 0.11 | 10.10 | 20.79 | 16.11 | 6.20 | 0.07 | 26.28 | 37.76 | 33.36 | 15.06 | 0.19 | 40.61 | 52.20 | 46.34 | 7.94 | 0.30 | 33.51 | 42.30 | 37.35 | 2054 | 665 | 2755 |
| *111* | 9 | 9 | 7 | 45 | 27.64 | 0.06 | 10.07 | 24.46 | 19.20 | 33.84 | 0.06 | 26.26 | 66.36 | 51.71 | 50.18 | 0.10 | 40.61 | 69.35 | 57.10 | 37.62 | 0.12 | 33.69 | 70.80 | 54.15 | 1928 | 400 | 3146 |
| *112* | 8 | 10 | 7 | 45 | 26.74 | 0.06 | 10.02 | 24.37 | 19.13 | 31.84 | 0.07 | 26.49 | 66.36 | 51.07 | 49.10 | 0.11 | 40.73 | 69.66 | 56.99 | 36.30 | 0.13 | 33.89 | 70.82 | 53.88 | 1931 | 422 | 3121 |
| *113* | 7 | 12 | 7 | 45 | 21.70 | 0.15 | 10.22 | 21.61 | 16.18 | 29.16 | 0.11 | 26.36 | 64.64 | 47.87 | 47.68 | 0.14 | 40.72 | 68.78 | 55.65 | 34.52 | 0.18 | 33.79 | 69.25 | 51.55 | 1979 | 446 | 3049 |
| *114* | 5 | 15 | 7 | 45 | 16.08 | 0.04 | 10.00 | 21.59 | 17.88 | 21.50 | 0.06 | 26.72 | 39.72 | 34.97 | 43.00 | 0.16 | 40.84 | 68.00 | 54.84 | 27.42 | 0.13 | 34.09 | 45.88 | 40.47 | 1997 | 530 | 2947 |
| *115* | 2 | 28 | 7 | 45 | 6.66 | 0.18 | 10.09 | 21.70 | 15.90 | 8.86 | 0.11 | 26.35 | 39.04 | 33.48 | 21.52 | 0.18 | 40.77 | 53.29 | 47.04 | 11.34 | 0.04 | 33.84 | 45.10 | 41.50 | 2045 | 614 | 2815 |
| *116* | 9 | 9 | 4 | 45 | 38.64 | 0.06 | 10.08 | 55.86 | 39.14 | 44.18 | 0.06 | 26.22 | 66.07 | 51.51 | 54.38 | 0.11 | 40.59 | 70.09 | 57.17 | 46.46 | 0.07 | 33.71 | 71.03 | 56.72 | 1589 | 152 | 3733 |
| *117* | 8 | 10 | 4 | 45 | 37.26 | 0.10 | 10.04 | 55.79 | 36.29 | 43.00 | 0.05 | 26.48 | 66.07 | 52.43 | 53.74 | 0.12 | 40.70 | 70.40 | 57.07 | 45.66 | 0.05 | 33.94 | 71.04 | 58.26 | 1679 | 176 | 3619 |
| *118* | 7 | 12 | 4 | 45 | 35.48 | 0.04 | 10.33 | 54.04 | 40.06 | 41.50 | 0.06 | 26.42 | 65.33 | 51.11 | 52.92 | 0.16 | 40.74 | 69.97 | 55.81 | 44.70 | 0.20 | 33.71 | 69.07 | 50.95 | 1757 | 214 | 3503 |
| *119* | 5 | 15 | 4 | 45 | 28.12 | 0.34 | 10.01 | 54.47 | 28.77 | 35.66 | 0.22 | 26.73 | 65.39 | 45.12 | 50.26 | 0.13 | 40.82 | 69.22 | 56.19 | 40.36 | 0.16 | 33.83 | 45.72 | 39.96 | 1891 | 318 | 3265 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *120* | 2 | 28 | 4 | 45 | 11.68 | 0.69 | 10.41 | 23.05 | 14.69 | 15.48 | 0.46 | 26.50 | 65.40 | 41.50 | 35.92 | 0.07 | 40.77 | 67.78 | 57.42 | 19.86 | 0.11 | 33.69 | 44.90 | 39.99 | 2015 | 487 | 2972 |
| *121* | 8 | 8 | 10 | 90 | 16.48 | 0.06 | 10.09 | 22.01 | 17.66 | 22.12 | 0.05 | 26.28 | 41.09 | 35.99 | 41.38 | 0.03 | 40.92 | 72.08 | 63.07 | 35.20 | 0.05 | 33.65 | 46.93 | 42.36 | 2004 | 574 | 2896 |
| *122* | 7 | 9 | 10 | 90 | 14.74 | 0.12 | 10.04 | 21.47 | 16.34 | 20.20 | 0.10 | 26.63 | 39.81 | 34.19 | 41.26 | 0.05 | 41.50 | 71.86 | 61.40 | 26.42 | 0.13 | 33.99 | 45.58 | 40.26 | 2021 | 580 | 2873 |
| *123* | 5 | 11 | 10 | 90 | 11.06 | 0.07 | 9.96 | 20.51 | 16.47 | 15.34 | 0.09 | 26.18 | 38.41 | 33.35 | 38.98 | 0.09 | 40.62 | 53.94 | 48.43 | 18.36 | 0.10 | 33.50 | 42.64 | 38.74 | 2034 | 611 | 2829 |
| *124* | 4 | 14 | 10 | 90 | 9.06 | 0.08 | 9.98 | 20.26 | 16.16 | 12.64 | 0.09 | 26.15 | 37.87 | 33.02 | 36.76 | 0.12 | 40.61 | 53.08 | 47.48 | 15.00 | 0.15 | 33.44 | 42.05 | 37.95 | 2042 | 624 | 2808 |
| *125* | 2 | 24 | 10 | 90 | 4.68 | 0.10 | 10.18 | 19.53 | 15.54 | 6.56 | 0.18 | 26.21 | 36.14 | 31.18 | 22.24 | 0.25 | 40.58 | 50.59 | 45.18 | 7.70 | 0.33 | 33.41 | 40.36 | 36.37 | 2050 | 664 | 2760 |
| *126* | 8 | 8 | 7 | 90 | 23.26 | 0.07 | 9.98 | 23.14 | 18.09 | 30.64 | 0.05 | 26.17 | 66.28 | 52.46 | 46.46 | 0.08 | 40.58 | 69.21 | 57.78 | 35.62 | 0.06 | 33.57 | 70.90 | 57.26 | 1950 | 424 | 3100 |
| *127* | 7 | 9 | 7 | 90 | 21.08 | 0.13 | 10.03 | 21.65 | 16.32 | 28.82 | 0.12 | 26.60 | 40.63 | 34.33 | 46.36 | 0.09 | 41.65 | 72.63 | 59.82 | 33.62 | 0.17 | 34.04 | 46.61 | 40.42 | 1979 | 450 | 3045 |
| *128* | 5 | 11 | 7 | 90 | 15.80 | 0.06 | 9.87 | 20.63 | 16.70 | 21.92 | 0.06 | 26.30 | 39.43 | 34.63 | 44.68 | 0.06 | 41.18 | 71.94 | 60.70 | 26.24 | 0.10 | 33.75 | 45.20 | 40.32 | 2007 | 519 | 2948 |
| *129* | 4 | 14 | 7 | 90 | 13.10 | 0.03 | 9.90 | 20.50 | 17.43 | 18.06 | 0.03 | 26.25 | 39.03 | 35.33 | 43.16 | 0.03 | 41.19 | 71.20 | 62.52 | 21.44 | 0.06 | 33.71 | 44.71 | 40.69 | 2004 | 564 | 2906 |
| *130* | 2 | 24 | 7 | 90 | 6.66 | 0.11 | 10.07 | 20.09 | 15.70 | 9.36 | 0.06 | 26.38 | 37.65 | 33.53 | 31.54 | 0.03 | 41.61 | 68.69 | 60.86 | 11.00 | 0.14 | 33.78 | 43.07 | 38.72 | 2044 | 614 | 2816 |
| *131* | 8 | 8 | 4 | 90 | 36.38 | 0.05 | 9.91 | 55.31 | 39.67 | 41.68 | 0.03 | 26.14 | 65.92 | 54.41 | 51.98 | 0.09 | 40.58 | 69.99 | 57.83 | 45.26 | 0.06 | 33.57 | 70.90 | 57.26 | 1686 | 185 | 3603 |
| *132* | 7 | 9 | 4 | 90 | 34.60 | 0.06 | 10.05 | 54.23 | 38.09 | 40.54 | 0.04 | 26.58 | 65.37 | 52.97 | 51.92 | 0.04 | 41.96 | 73.14 | 63.17 | 44.12 | 0.05 | 34.08 | 70.20 | 57.76 | 1760 | 218 | 3496 |
| *133* | 5 | 11 | 4 | 90 | 27.66 | 0.11 | 9.90 | 53.95 | 34.66 | 35.76 | 0.11 | 26.33 | 64.92 | 48.02 | 50.90 | 0.12 | 40.66 | 69.41 | 56.51 | 39.66 | 0.13 | 33.67 | 44.94 | 39.77 | 1892 | 318 | 3264 |
| *134* | 4 | 14 | 4 | 90 | 22.70 | 0.24 | 9.97 | 54.25 | 30.55 | 29.66 | 0.27 | 26.39 | 64.93 | 43.74 | 50.04 | 0.11 | 40.69 | 68.69 | 56.43 | 35.66 | 0.13 | 33.64 | 44.45 | 39.49 | 1935 | 373 | 3166 |
| *135* | 2 | 24 | 4 | 90 | 11.68 | 0.51 | 10.17 | 21.82 | 14.52 | 16.38 | 0.41 | 26.68 | 40.09 | 32.03 | 43.38 | 0.18 | 40.84 | 53.44 | 47.15 | 19.26 | 0.24 | 33.67 | 43.12 | 38.06 | 2015 | 496 | 2963 |
| *136* | 8 | 8 | 10 | 135 | 16.26 | 0.06 | 10.04 | 22.63 | 18.03 | 22.22 | 0.09 | 26.68 | 41.34 | 35.28 | 44.42 | 0.02 | 41.32 | 72.95 | 65.06 | 27.10 | 0.05 | 33.99 | 45.54 | 41.56 | 2004 | 574 | 2896 |
| *137* | 7 | 9 | 10 | 135 | 17.48 | 0.04 | 10.10 | 22.23 | 18.35 | 24.14 | 0.08 | 26.52 | 40.51 | 34.92 | 45.92 | 0.05 | 40.79 | 69.14 | 59.37 | 28.50 | 0.11 | 33.89 | 46.43 | 40.94 | 2021 | 580 | 2873 |
| *138* | 5 | 11 | 10 | 135 | 18.08 | 0.01 | 10.25 | 21.91 | 19.69 | 24.92 | 0.11 | 26.52 | 39.07 | 33.57 | 47.90 | 0.02 | 41.23 | 71.70 | 64.10 | 28.32 | 0.06 | 33.75 | 43.33 | 39.83 | 2034 | 611 | 2829 |
| *139* | 4 | 14 | 10 | 135 | 17.58 | 0.01 | 10.12 | 21.74 | 19.53 | 26.52 | 0.15 | 26.51 | 38.57 | 32.82 | 49.78 | 0.02 | 41.25 | 70.82 | 63.44 | 27.36 | 0.14 | 33.73 | 42.80 | 38.56 | 2042 | 624 | 2808 |
| *140* | 2 | 24 | 10 | 135 | 10.68 | 0.02 | 10.25 | 21.36 | 18.59 | 17.32 | 0.09 | 26.41 | 36.97 | 32.60 | 51.28 | 0.03 | 41.05 | 54.78 | 50.81 | 16.40 | 0.20 | 33.57 | 41.30 | 37.34 | 2050 | 664 | 2760 |
| *141* | 8 | 8 | 7 | 135 | 23.24 | 0.06 | 10.08 | 24.91 | 19.49 | 31.12 | 0.10 | 26.57 | 66.17 | 49.29 | 49.02 | 0.02 | 41.46 | 73.40 | 65.43 | 35.30 | 0.16 | 34.02 | 70.76 | 52.96 | 1950 | 424 | 3100 |
| *142* | 7 | 9 | 7 | 135 | 24.96 | 0.05 | 10.03 | 23.56 | 18.90 | 32.82 | 0.08 | 26.48 | 65.55 | 49.95 | 50.08 | 0.02 | 41.19 | 73.14 | 65.17 | 36.24 | 0.13 | 33.90 | 70.16 | 53.53 | 1979 | 450 | 3045 |
| *143* | 5 | 11 | 7 | 135 | 25.56 | 0.01 | 10.12 | 22.36 | 20.03 | 33.76 | 0.08 | 26.43 | 64.51 | 49.31 | 51.42 | 0.01 | 41.40 | 72.32 | 66.44 | 35.86 | 0.16 | 33.88 | 46.00 | 40.13 | 2007 | 519 | 2948 |
| *144* | 4 | 14 | 7 | 135 | 25.04 | 0.01 | 41.40 | 71.48 | 65.76 | 34.28 | 0.11 | 26.54 | 39.58 | 33.87 | 52.76 | 0.01 | 41.40 | 71.48 | 65.76 | 35.22 | 0.22 | 33.95 | 45.58 | 39.48 | 2004 | 564 | 2906 |
| *145* | 2 | 24 | 7 | 135 | 15.24 | 0.03 | 10.15 | 22.41 | 18.86 | 24.78 | 0.05 | 26.42 | 38.26 | 34.18 | 39.84 | 0.03 | 41.13 | 55.71 | 51.49 | 23.44 | 0.07 | 33.77 | 44.17 | 40.18 | 2044 | 614 | 2816 |
| *146* | 8 | 8 | 4 | 135 | 36.38 | 0.05 | 10.02 | 56.00 | 40.16 | 42.36 | 0.05 | 26.60 | 65.94 | 52.39 | 53.66 | 0.04 | 40.93 | 70.64 | 61.14 | 44.92 | 0.12 | 33.81 | 47.35 | 41.27 | 1686 | 185 | 3603 |
| *147* | 7 | 9 | 4 | 135 | 37.42 | 0.03 | 9.92 | 55.42 | 42.26 | 43.30 | 0.03 | 26.69 | 65.56 | 54.32 | 54.28 | 0.01 | 41.32 | 73.35 | 67.26 | 45.46 | 0.02 | 33.96 | 70.54 | 61.42 | 1760 | 218 | 3496 |
| *148* | 5 | 11 | 4 | 135 | 37.42 | 0.01 | 10.28 | 54.92 | 46.43 | 43.66 | 0.09 | 26.37 | 65.25 | 49.17 | 55.06 | 0.05 | 41.59 | 72.91 | 62.12 | 45.10 | 0.11 | 33.81 | 45.59 | 40.43 | 1892 | 318 | 3264 |
| *149* | 4 | 14 | 4 | 135 | 37.16 | 0.01 | 10.09 | 22.64 | 20.25 | 44.00 | 0.09 | 26.52 | 65.26 | 49.24 | 55.82 | 0.08 | 41.57 | 72.23 | 59.99 | 44.74 | 0.18 | 33.84 | 45.15 | 39.50 | 1935 | 373 | 3166 |
| *150* | 2 | 24 | 4 | 135 | 26.68 | 0.03 | 10.11 | 23.95 | 19.95 | 38.18 | 0.34 | 26.40 | 40.51 | 32.35 | 56.44 | 0.12 | 41.25 | 69.77 | 56.97 | 37.32 | 0.04 | 33.73 | 43.96 | 40.69 | 2015 | 496 | 2963 |
| *151* | 8 | 8 | 10 | 0 | 16.28 | 0.04 | 10.05 | 22.21 | 18.32 | 22.12 | 0.05 | 26.44 | 41.04 | 36.01 | 41.38 | 0.03 | 41.10 | 71.93 | 63.01 | 27.26 | 0.09 | 33.81 | 46.85 | 41.46 | 2004 | 574 | 2896 |
| *152* | 7 | 9 | 10 | 0 | 17.46 | 0.09 | 10.23 | 22.37 | 17.35 | 33.40 | 0.03 | 26.42 | 40.70 | 36.57 | 40.90 | 0.02 | 41.11 | 71.90 | 64.22 | 29.06 | 0.04 | 33.75 | 44.92 | 41.35 | 2021 | 580 | 2873 |
| *153* | 5 | 11 | 10 | 0 | 18.06 | 0.08 | 10.13 | 20.69 | 16.47 | 23.02 | 0.01 | 26.41 | 39.18 | 36.75 | 37.66 | 0.01 | 41.21 | 70.59 | 65.00 | 29.86 | 0.02 | 33.71 | 44.73 | 41.98 | 2034 | 611 | 2829 |
| *154* | 4 | 14 | 10 | 0 | 17.50 | 0.08 | 10.07 | 20.43 | 16.29 | 21.40 | 0.00 | 26.31 | 63.43 | 63.43 | 34.64 | 0.00 | 41.09 | 69.71 | 69.71 | 29.94 | 0.01 | 33.59 | 67.45 | 61.01 | 2042 | 624 | 2808 |
| *155* | 2 | 24 | 10 | 0 | 10.60 | 0.14 | 10.27 | 53.23 | 33.13 | 19.44 | 0.01 | 26.41 | 61.95 | 55.19 | 34.00 | 0.00 | 41.11 | 66.74 | 66.74 | 29.72 | 0.02 | 33.52 | 65.73 | 57.70 | 2050 | 664 | 2760 |
| *156* | 8 | 8 | 7 | 0 | 13.24 | 0.05 | 9.97 | 23.25 | 18.68 | 30.64 | 0.06 | 26.30 | 65.73 | 51.32 | 46.44 | 0.05 | 41.20 | 72.64 | 61.81 | 35.64 | 0.07 | 33.76 | 45.61 | 41.07 | 1950 | 424 | 3100 |
| *157* | 7 | 9 | 7 | 0 | 24.90 | 0.09 | 10.19 | 22.73 | 17.54 | 31.66 | 0.05 | 26.25 | 65.58 | 52.03 | 45.92 | 0.04 | 41.19 | 72.45 | 62.46 | 36.88 | 0.06 | 33.73 | 45.60 | 41.26 | 1979 | 450 | 3045 |
| *158* | 5 | 11 | 7 | 0 | 25.52 | 0.05 | 10.06 | 21.17 | 17.34 | 31.08 | 0.02 | 26.39 | 64.33 | 54.87 | 43.78 | 0.02 | 41.37 | 71.41 | 63.92 | 37.22 | 0.05 | 33.78 | 68.71 | 56.68 | 2007 | 519 | 2948 |
| *159* | 4 | 14 | 7 | 0 | 24.94 | 0.01 | 10.00 | 54.19 | 45.78 | 29.76 | 0.01 | 26.27 | 63.94 | 56.77 | 41.66 | 0.01 | 41.22 | 70.56 | 64.98 | 37.30 | 0.02 | 33.66 | 68.22 | 59.60 | 2004 | 564 | 2906 |
| *160* | 2 | 24 | 7 | 0 | 15.14 | 0.02 | 10.21 | 53.82 | 42.94 | 17.80 | 0.01 | 26.30 | 62.62 | 55.71 | 27.80 | 0.00 | 41.19 | 67.71 | 67.71 | 27.78 | 0.02 | 33.62 | 66.57 | 58.35 | 2044 | 614 | 2816 |
| *161* | 8 | 8 | 4 | 0 | 36.38 | 0.05 | 9.85 | 54.74 | 39.28 | 41.68 | 0.04 | 26.28 | 65.57 | 53.01 | 51.98 | 0.03 | 41.40 | 73.35 | 64.11 | 45.26 | 0.10 | 33.64 | 46.23 | 40.86 | 1686 | 185 | 3603 |
| *162* | 7 | 9 | 4 | 0 | 27.64 | 0.03 | 10.18 | 54.67 | 41.80 | 42.24 | 0.02 | 26.15 | 65.19 | 55.45 | 51.76 | 0.01 | 41.37 | 72.89 | 66.89 | 45.94 | 0.08 | 33.57 | 46.18 | 41.15 | 1760 | 218 | 3496 |
| *163* | 5 | 11 | 4 | 0 | 37.38 | 0.12 | 10.03 | 53.59 | 34.04 | 41.62 | 0.02 | 26.41 | 64.66 | 55.12 | 50.40 | 0.02 | 41.63 | 72.61 | 64.88 | 46.04 | 0.04 | 33.86 | 69.20 | 57.90 | 1892 | 318 | 3264 |
| *164* | 4 | 14 | 4 | 0 | 37.12 | 0.24 | 9.85 | 53.74 | 30.25 | 40.96 | 0.01 | 26.25 | 64.44 | 57.17 | 49.20 | 0.01 | 41.43 | 71.85 | 66.06 | 46.10 | 0.03 | 33.73 | 68.78 | 58.64 | 1935 | 373 | 3166 |
| *165* | 2 | 24 | 4 | 0 | 26.50 | 0.40 | 10.05 | 53.82 | 27.65 | 30.94 | 0.02 | 26.22 | 63.43 | 54.15 | 41.16 | 0.01 | 41.35 | 69.18 | 63.88 | 40.52 | 0.03 | 33.68 | 67.30 | 57.57 | 2015 | 496 | 2963 |
| *166* | 8 | 8 | 10 | 45 | 16.26 | 0.04 | 10.02 | 23.49 | 19.18 | 22.24 | 0.05 | 26.42 | 41.37 | 36.22 | 44.38 | 0.07 | 40.61 | 68.58 | 57.86 | 27.12 | 0.10 | 33.64 | 45.55 | 40.47 | 2004 | 574 | 2896 |
| *167* | 7 | 9 | 10 | 45 | 14.74 | 0.12 | 10.29 | 23.77 | 17.72 | 19.98 | 0.08 | 26.55 | 40.70 | 35.05 | 42.38 | 0.07 | 40.79 | 68.46 | 57.85 | 24.74 | 0.07 | 33.83 | 45.60 | 41.09 | 2021 | 580 | 2873 |
| *168* | 5 | 11 | 10 | 45 | 11.06 | 0.08 | 9.96 | 21.49 | 16.89 | 14.84 | 0.08 | 26.49 | 38.79 | 33.88 | 35.78 | 0.08 | 40.72 | 53.92 | 48.65 | 18.68 | 0.10 | 33.66 | 43.35 | 39.22 | 2034 | 611 | 2829 |
| *169* | 4 | 14 | 10 | 45 | 9.06 | 0.10 | 9.93 | 21.30 | 16.45 | 12.10 | 0.07 | 26.35 | 38.29 | 33.71 | 29.98 | 0.11 | 40.70 | 53.06 | 47.65 | 15.36 | 0.14 | 33.61 | 42.82 | 38.51 | 2042 | 624 | 2808 |
| *170* | 2 | 24 | 10 | 45 | 4.68 | 0.19 | 10.12 | 20.81 | 15.40 | 6.18 | 0.13 | 26.38 | 36.68 | 31.96 | 15.06 | 0.19 | 40.56 | 50.58 | 45.51 | 7.94 | 0.27 | 33.51 | 41.35 | 37.04 | 2050 | 664 | 2760 |
| *171* | 8 | 8 | 7 | 45 | 23.24 | 0.05 | 9.95 | 24.75 | 19.65 | 31.12 | 0.05 | 26.30 | 66.35 | 52.55 | 49.02 | 0.09 | 40.62 | 69.20 | 57.38 | 35.30 | 0.10 | 33.73 | 70.75 | 54.97 | 1950 | 424 | 3100 |
| *172* | 7 | 9 | 7 | 45 | 21.06 | 0.13 | 10.34 | 23.96 | 17.71 | 28.54 | 0.09 | 26.47 | 65.54 | 49.38 | 47.60 | 0.10 | 40.77 | 69.02 | 56.98 | 33.54 | 0.15 | 33.91 | 70.32 | 40.43 | 1979 | 450 | 3045 |
| *173* | 5 | 11 | 7 | 45 | 15.80 | 0.14 | 10.02 | 54.47 | 33.67 | 21.20 | 0.06 | 26.51 | 39.84 | 34.97 | 42.98 | 0.10 | 40.75 | 67.99 | 56.38 | 26.68 | 0.13 | 33.91 | 45.95 | 40.71 | 2007 | 519 | 2948 |
| *174* | 4 | 14 | 7 | 45 | 12.96 | 0.32 | 10.08 | 54.87 | 29.31 | 17.28 | 0.02 | 26.42 | 39.46 | 36.21 | 38.90 | 0.12 | 40.73 | 67.25 | 55.35 | 21.94 | 0.09 | 33.86 | 45.54 | 40.71 | 2004 | 564 | 2906 |
| *175* | 2 | 24 | 7 | 45 | 6.66 | 0.04 | 10.22 | 21.70 | 18.03 | 8.84 | 0.02 | 26.47 | 38.18 | 35.26 | 21.52 | 0.20 | 40.72 | 51.74 | 46.09 | 11.32 | 0.12 | 33.82 | 44.15 | 39.51 | 2044 | 614 | 2816 |
| *176* | 8 | 8 | 4 | 45 | 36.40 | 0.06 | 9.90 | 56.13 | 39.24 | 42.38 | 0.04 | 26.23 | 66.08 | 53.34 | 53.70 | 0.10 | 40.60 | 69.94 | 57.43 | 44.92 | 0.05 | 33.71 | 70.98 | 58.14 | 1686 | 185 | 3603 |
| *177* | 7 | 9 | 4 | 45 | 34.60 | 0.04 | 10.35 | 55.45 | 41.03 | 40.88 | 0.02 | 26.48 | 65.67 | 55.89 | 52.88 | 0.13 | 40.73 | 69.65 | 56.39 | 43.92 | 0.19 | 33.72 | 69.99 | 51.64 | 1760 | 218 | 3496 |
| *178* | 5 | 11 | 4 | 45 | 27.64 | 0.06 | 9.98 | 21.81 | 17.49 | 35.26 | 0.09 | 26.45 | 65.39 | 49.29 | 50.24 | 0.12 | 40.74 | 69.23 | 56.45 | 39.80 | 0.13 | 33.79 | 45.78 | 40.28 | 1892 | 318 | 3264 |
| *179* | 4 | 14 | 4 | 45 | 22.66 | 0.02 | 9.97 | 21.79 | 18.84 | 30.22 | 0.20 | 26.34 | 65.44 | 45.40 | 47.90 | 0.10 | 40.72 | 68.51 | 56.66 | 36.10 | 0.11 | 33.75 | 45.35 | 40.27 | 1935 | 373 | 3166 |
| *180* | 2 | 24 | 4 | 45 | 11.66 | 0.52 | 10.45 | 23.05 | 15.13 | 15.48 | 0.33 | 26.60 | 65.21 | 43.03 | 36.08 | 0.14 | 40.81 | 66.47 | 54.46 | 19.84 | 0.18 | 33.70 | 44.22 | 38.97 | 2015 | 496 | 2963 |
| *181* | 5 | 5 | 10 | 90 | 16.26 | 0.02 | 10.34 | 21.24 | 18.52 | 13.82 | 0.01 | 26.64 | 38.97 | 36.62 | 32.56 | 0.01 | 41.74 | 70.38 | 64.93 | 17.04 | 0.02 | 33.95 | 44.59 | 41.94 | 2045 | 640 | 2789 |
| *182* | 5 | 6 | 10 | 90 | 17.74 | 0.03 | 10.32 | 21.33 | 18.14 | 14.28 | 0.03 | 26.61 | 39.17 | 35.54 | 34.52 | 0.01 | 41.71 | 70.70 | 65.18 | 17.44 | 0.04 | 33.93 | 44.80 | 41.32 | 2044 | 626 | 2804 |
| *183* | 4 | 8 | 10 | 90 | 8.78 | 0.06 | 10.25 | 21.21 | 17.21 | 12.16 | 0.08 | 26.56 | 38.92 | 33.98 | 34.02 | 0.03 | 41.77 | 70.31 | 62.05 | 14.60 | 0.11 | 33.88 | 44.54 | 39.87 | 2042 | 628 | 2804 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *184* | 3 | 10 | 10 | 90 | 6.78 | 0.13 | 10.38 | 21.10 | 16.18 | 9.46 | 0.09 | 26.50 | 38.64 | 33.62 | 30.08 | 0.06 | 41.55 | 57.01 | 51.36 | 11.22 | 0.14 | 33.72 | 44.22 | 39.31 | 2049 | 640 | 2785 |
| *185* | 2 | 16 | 10 | 90 | 4.64 | 0.17 | 10.22 | 19.57 | 14.97 | 6.50 | 0.18 | 26.29 | 36.16 | 31.23 | 21.86 | 0.17 | 40.61 | 50.58 | 45.67 | 7.66 | 0.22 | 33.45 | 40.36 | 36.74 | 2045 | 659 | 2770 |
| *186* | 5 | 5 | 7 | 90 | 14.52 | 0.05 | 10.26 | 21.81 | 17.83 | 19.74 | 0.04 | 26.86 | 40.12 | 35.88 | 39.46 | 0.02 | 41.90 | 71.28 | 63.95 | 24.36 | 0.06 | 34.26 | 45.85 | 41.62 | 2007 | 566 | 2901 |
| *187* | 5 | 6 | 7 | 90 | 14.92 | 0.06 | 10.29 | 21.81 | 17.60 | 20.40 | 0.06 | 26.82 | 40.25 | 35.34 | 41.04 | 0.04 | 41.86 | 71.58 | 62.08 | 24.92 | 0.09 | 34.23 | 46.02 | 41.14 | 2010 | 543 | 2921 |
| *188* | 4 | 8 | 7 | 90 | 12.56 | 0.08 | 10.24 | 21.70 | 17.12 | 17.38 | 0.10 | 26.71 | 40.02 | 34.35 | 40.78 | 0.07 | 41.87 | 71.20 | 59.96 | 20.84 | 0.15 | 34.14 | 45.78 | 40.23 | 2006 | 568 | 2900 |
| *189* | 3 | 10 | 7 | 90 | 9.70 | 0.12 | 10.30 | 21.58 | 16.52 | 13.52 | 0.09 | 26.53 | 39.75 | 34.28 | 37.96 | 0.07 | 41.59 | 70.73 | 59.56 | 16.06 | 0.14 | 33.87 | 45.48 | 40.05 | 2025 | 594 | 2855 |
| *190* | 2 | 16 | 7 | 90 | 6.62 | 0.12 | 10.16 | 20.14 | 15.66 | 9.28 | 0.18 | 26.44 | 37.69 | 32.07 | 31.02 | 0.14 | 41.70 | 68.70 | 56.07 | 10.94 | 0.26 | 33.82 | 43.08 | 38.03 | 2044 | 614 | 2816 |
| *191* | 5 | 5 | 4 | 90 | 25.42 | 0.05 | 10.35 | 54.87 | 39.53 | 32.66 | 0.05 | 26.89 | 65.47 | 52.18 | 47.50 | 0.04 | 42.21 | 72.01 | 62.48 | 37.44 | 0.06 | 34.31 | 69.98 | 56.95 | 1916 | 357 | 3201 |
| *192* | 5 | 6 | 4 | 90 | 29.04 | 0.05 | 10.42 | 54.73 | 39.47 | 33.60 | 0.05 | 26.84 | 65.44 | 52.14 | 48.54 | 0.04 | 42.17 | 72.25 | 62.63 | 38.12 | 0.07 | 34.28 | 70.02 | 56.32 | 1910 | 344 | 3220 |
| *193* | 4 | 8 | 4 | 90 | 0.00 | 0.04 | 10.40 | 54.88 | 40.66 | 32.60 | 0.04 | 26.83 | 65.46 | 53.11 | 48.44 | 0.04 | 42.13 | 71.96 | 62.42 | 0.00 | 0.05 | 34.32 | 69.96 | 57.68 | 1931 | 393 | 3150 |
| *194* | 3 | 10 | 4 | 90 | 16.96 | 0.08 | 10.43 | 22.28 | 17.55 | 23.66 | 0.06 | 26.53 | 41.21 | 35.85 | 46.78 | 0.05 | 41.75 | 71.60 | 61.32 | 28.08 | 0.07 | 34.07 | 47.11 | 42.11 | 1979 | 446 | 3049 |
| *195* | 2 | 16 | 4 | 90 | 11.60 | 0.17 | 10.26 | 21.90 | 16.17 | 14.66 | 0.10 | 26.76 | 40.15 | 34.44 | 42.86 | 0.21 | 40.87 | 53.44 | 46.92 | 19.14 | 0.27 | 33.69 | 43.13 | 37.94 | 2005 | 518 | 2951 |
| *196* | 5 | 5 | 10 | 135 | 10.18 | 0.01 | 10.31 | 22.15 | 19.90 | 13.90 | 0.01 | 26.69 | 39.78 | 37.29 | 31.48 | 0.01 | 41.02 | 67.86 | 62.75 | 17.00 | 0.02 | 33.99 | 45.59 | 42.70 | 2045 | 640 | 2789 |
| *197* | 5 | 6 | 10 | 135 | 11.82 | 0.01 | 10.38 | 22.20 | 19.95 | 16.26 | 0.03 | 26.78 | 39.96 | 36.15 | 39.18 | 0.02 | 41.07 | 68.14 | 61.39 | 9.64 | 0.04 | 34.07 | 45.78 | 42.04 | 2044 | 626 | 2804 |
| *198* | 4 | 8 | 10 | 135 | 13.68 | 0.01 | 10.42 | 22.12 | 19.89 | 19.48 | 0.09 | 26.68 | 39.73 | 34.33 | 43.66 | 0.06 | 41.02 | 67.81 | 58.02 | 22.24 | 0.12 | 33.99 | 45.55 | 40.36 | 2042 | 628 | 2804 |
| *199* | 3 | 10 | 10 | 135 | 13.00 | 0.03 | 10.44 | 22.06 | 18.70 | 19.78 | 0.11 | 26.79 | 39.48 | 33.92 | 46.00 | 0.07 | 41.16 | 67.40 | 57.34 | 20.48 | 0.15 | 34.02 | 45.27 | 39.91 | 2049 | 640 | 2785 |
| *200* | 2 | 16 | 10 | 135 | 10.22 | 0.01 | 10.35 | 21.40 | 19.30 | 16.52 | 0.10 | 26.41 | 36.99 | 32.48 | 49.00 | 0.05 | 41.06 | 54.79 | 50.06 | 15.88 | 0.13 | 33.58 | 41.31 | 37.76 | 2045 | 659 | 2770 |
| *201* | 5 | 5 | 7 | 135 | 14.54 | 0.03 | 10.27 | 24.11 | 20.11 | 19.86 | 0.03 | 26.70 | 40.87 | 36.77 | 42.56 | 0.01 | 41.33 | 71.75 | 65.96 | 24.28 | 0.05 | 34.09 | 46.88 | 42.47 | 2007 | 566 | 2901 |
| *202* | 5 | 6 | 7 | 135 | 16.88 | 0.03 | 10.38 | 24.03 | 20.08 | 23.24 | 0.05 | 26.76 | 65.32 | 52.04 | 45.26 | 0.01 | 41.51 | 72.06 | 66.25 | 27.80 | 0.08 | 34.15 | 47.01 | 41.88 | 2010 | 543 | 2921 |
| *203* | 4 | 8 | 7 | 135 | 19.54 | 0.02 | 10.41 | 23.99 | 20.60 | 27.48 | 0.12 | 26.68 | 40.77 | 34.45 | 48.42 | 0.02 | 41.79 | 71.67 | 64.22 | 30.20 | 0.16 | 34.12 | 46.80 | 40.66 | 2006 | 568 | 2900 |
| *204* | 3 | 10 | 7 | 135 | 18.56 | 0.03 | 10.43 | 23.94 | 20.03 | 27.58 | 0.12 | 26.96 | 40.52 | 34.43 | 50.04 | 0.01 | 41.59 | 71.18 | 65.55 | 28.62 | 0.18 | 34.22 | 46.55 | 40.39 | 2025 | 594 | 2855 |
| *205* | 2 | 16 | 7 | 135 | 14.68 | 0.01 | 10.25 | 22.47 | 20.14 | 23.64 | 0.05 | 26.41 | 38.29 | 34.20 | 52.16 | 0.01 | 41.14 | 55.72 | 52.95 | 22.68 | 0.14 | 33.76 | 44.19 | 39.31 | 2044 | 614 | 2816 |
| *206* | 5 | 5 | 4 | 135 | 25.42 | 0.02 | 10.15 | 56.47 | 44.92 | 33.24 | 0.02 | 26.45 | 65.47 | 55.74 | 49.92 | 0.00 | 41.44 | 72.19 | 72.19 | 37.12 | 0.05 | 34.13 | 70.41 | 57.91 | 1916 | 357 | 3201 |
| *207* | 5 | 6 | 4 | 135 | 29.08 | 0.02 | 10.31 | 56.24 | 44.78 | 36.42 | 0.03 | 26.63 | 65.60 | 54.33 | 51.48 | 0.00 | 41.64 | 72.44 | 72.44 | 39.56 | 0.05 | 34.18 | 70.43 | 57.94 | 1910 | 344 | 3220 |
| *208* | 4 | 8 | 4 | 135 | 31.86 | 0.05 | 10.41 | 24.17 | 19.43 | 39.14 | 0.06 | 26.63 | 65.59 | 51.36 | 53.32 | 0.02 | 41.97 | 72.14 | 64.61 | 41.04 | 0.08 | 34.18 | 70.39 | 55.93 | 1931 | 393 | 3150 |
| *209* | 3 | 10 | 4 | 135 | 30.88 | 0.05 | 10.30 | 24.65 | 19.71 | 39.06 | 0.06 | 26.96 | 65.64 | 51.51 | 54.20 | 0.02 | 41.73 | 71.77 | 64.28 | 40.04 | 0.09 | 34.40 | 70.37 | 55.50 | 1979 | 446 | 3049 |
| *210* | 2 | 16 | 4 | 135 | 25.72 | 0.01 | 10.21 | 24.03 | 21.40 | 36.82 | 0.19 | 26.39 | 40.56 | 33.39 | 55.44 | 0.07 | 41.27 | 69.79 | 58.86 | 36.34 | 0.10 | 33.72 | 43.98 | 39.61 | 2005 | 518 | 2951 |
| *211* | 5 | 5 | 10 | 0 | 10.18 | 0.01 | 10.43 | 22.30 | 20.04 | 13.82 | 0.01 | 26.53 | 40.00 | 37.44 | 32.56 | 0.01 | 41.38 | 70.38 | 64.86 | 17.04 | 0.03 | 33.70 | 44.11 | 41.10 | 2045 | 640 | 2789 |
| *212* | 5 | 6 | 10 | 0 | 11.80 | 0.03 | 10.37 | 22.36 | 18.89 | 15.90 | 0.01 | 26.71 | 40.18 | 37.62 | 34.10 | 0.00 | 41.47 | 70.71 | 70.71 | 19.88 | 0.03 | 33.74 | 44.31 | 41.25 | 2044 | 626 | 2804 |
| *213* | 4 | 8 | 10 | 0 | 13.66 | 0.09 | 10.31 | 22.28 | 17.33 | 17.66 | 0.00 | 26.79 | 39.96 | 39.96 | 32.54 | 0.00 | 41.59 | 70.32 | 70.32 | 23.42 | 0.02 | 33.85 | 44.05 | 41.51 | 2042 | 628 | 2804 |
| *214* | 3 | 10 | 10 | 0 | 12.94 | 0.07 | 10.37 | 22.22 | 17.68 | 15.86 | 0.02 | 26.82 | 39.71 | 36.49 | 27.28 | 0.00 | 41.47 | 69.83 | 69.83 | 22.98 | 0.02 | 33.91 | 43.73 | 41.28 | 2049 | 640 | 2785 |
| *215* | 2 | 16 | 10 | 0 | 10.22 | 0.15 | 10.31 | 19.74 | 15.25 | 12.10 | 0.00 | 26.49 | 61.97 | 61.97 | 19.20 | 0.00 | 41.21 | 66.74 | 66.74 | 18.64 | 0.01 | 33.62 | 65.73 | 59.62 | 2045 | 659 | 2770 |
| *216* | 5 | 5 | 7 | 0 | 14.52 | 0.04 | 10.38 | 23.12 | 19.05 | 19.74 | 0.03 | 26.54 | 40.92 | 36.76 | 39.46 | 0.02 | 41.43 | 71.04 | 63.65 | 24.36 | 0.03 | 33.73 | 44.86 | 41.64 | 2007 | 566 | 2901 |
| *217* | 5 | 6 | 7 | 0 | 16.86 | 0.06 | 10.34 | 23.07 | 18.42 | 22.72 | 0.03 | 26.66 | 41.03 | 36.87 | 40.78 | 0.02 | 41.56 | 71.35 | 63.92 | 28.92 | 0.03 | 33.77 | 45.06 | 41.79 | 2010 | 543 | 2921 |
| *218* | 4 | 8 | 7 | 0 | 19.50 | 0.10 | 10.19 | 23.00 | 17.54 | 25.00 | 0.02 | 26.62 | 40.82 | 37.28 | 39.74 | 0.01 | 41.73 | 70.96 | 65.40 | 31.50 | 0.02 | 33.87 | 44.81 | 42.08 | 2006 | 568 | 2900 |
| *219* | 3 | 10 | 7 | 0 | 18.46 | 0.07 | 10.14 | 22.92 | 18.02 | 22.64 | 0.03 | 26.64 | 64.99 | 53.90 | 36.02 | 0.02 | 41.52 | 70.48 | 63.26 | 31.02 | 0.02 | 33.83 | 44.51 | 41.85 | 2025 | 594 | 2855 |
| *220* | 2 | 16 | 7 | 0 | 14.58 | 0.10 | 10.21 | 53.86 | 35.25 | 17.28 | 0.00 | 26.39 | 62.64 | 62.64 | 27.42 | 0.01 | 41.30 | 67.71 | 62.68 | 26.64 | 0.01 | 33.70 | 66.57 | 60.32 | 2044 | 614 | 2816 |
| *221* | 5 | 5 | 4 | 0 | 25.42 | 0.04 | 10.44 | 55.44 | 41.05 | 32.66 | 0.02 | 26.36 | 65.18 | 55.50 | 47.50 | 0.02 | 41.59 | 71.65 | 64.15 | 37.44 | 0.05 | 33.68 | 45.58 | 41.48 | 1916 | 357 | 3201 |
| *222* | 5 | 6 | 4 | 0 | 29.08 | 0.04 | 10.32 | 55.27 | 40.90 | 35.40 | 0.02 | 26.47 | 65.18 | 55.52 | 48.40 | 0.02 | 41.76 | 71.92 | 64.40 | 40.08 | 0.05 | 33.72 | 45.75 | 41.61 | 1910 | 344 | 3220 |
| *223* | 4 | 8 | 4 | 0 | 31.80 | 0.05 | 10.20 | 55.45 | 39.86 | 36.90 | 0.05 | 26.54 | 65.17 | 51.86 | 47.84 | 0.03 | 42.04 | 71.60 | 63.05 | 42.06 | 0.03 | 33.71 | 45.51 | 42.10 | 1931 | 393 | 3150 |
| *224* | 3 | 10 | 4 | 0 | 30.78 | 0.04 | 10.03 | 55.71 | 41.10 | 35.34 | 0.04 | 26.46 | 65.18 | 52.80 | 45.66 | 0.03 | 41.65 | 71.21 | 62.66 | 41.68 | 0.02 | 33.66 | 68.37 | 59.71 | 1979 | 446 | 3049 |
| *225* | 2 | 16 | 4 | 0 | 25.54 | 0.17 | 10.16 | 53.87 | 32.36 | 30.04 | 0.01 | 26.32 | 63.46 | 56.39 | 40.76 | 0.02 | 41.47 | 69.19 | 62.28 | 39.32 | 0.02 | 33.76 | 67.31 | 58.94 | 2005 | 518 | 2951 |
| *226* | 5 | 5 | 10 | 45 | 10.18 | 0.01 | 10.59 | 23.91 | 21.38 | 13.90 | 0.01 | 26.72 | 40.00 | 37.47 | 35.34 | 0.05 | 40.92 | 54.07 | 49.54 | 17.00 | 0.04 | 33.84 | 44.89 | 41.36 | 2045 | 640 | 2789 |
| *227* | 5 | 6 | 10 | 45 | 10.46 | 0.03 | 10.53 | 23.93 | 20.05 | 14.18 | 0.03 | 26.65 | 40.17 | 36.26 | 35.46 | 0.06 | 40.92 | 54.43 | 49.49 | 17.52 | 0.04 | 33.82 | 45.07 | 41.47 | 2044 | 626 | 2804 |
| *228* | 4 | 8 | 10 | 45 | 8.78 | 0.09 | 10.42 | 23.88 | 18.31 | 11.80 | 0.07 | 26.51 | 39.95 | 34.80 | 29.76 | 0.06 | 40.98 | 54.01 | 49.25 | 14.84 | 0.06 | 33.80 | 44.83 | 40.80 | 2042 | 628 | 2804 |
| *229* | 3 | 10 | 10 | 45 | 6.78 | 0.10 | 10.41 | 23.88 | 18.14 | 9.06 | 0.06 | 26.44 | 39.71 | 34.86 | 22.46 | 0.08 | 40.76 | 53.48 | 48.40 | 11.50 | 0.08 | 33.73 | 44.54 | 40.22 | 2049 | 640 | 2785 |
| *230* | 2 | 16 | 10 | 45 | 4.64 | 0.20 | 10.22 | 20.86 | 15.41 | 6.16 | 0.13 | 26.41 | 36.70 | 31.98 | 15.04 | 0.14 | 40.58 | 50.57 | 45.90 | 7.88 | 0.19 | 33.53 | 41.35 | 37.39 | 2045 | 659 | 2770 |
| *231* | 5 | 5 | 7 | 45 | 14.54 | 0.04 | 10.62 | 24.59 | 20.12 | 19.86 | 0.04 | 26.72 | 40.88 | 36.35 | 42.56 | 0.06 | 40.90 | 67.81 | 57.98 | 24.28 | 0.07 | 34.14 | 47.12 | 42.14 | 2007 | 566 | 2901 |
| *232* | 5 | 6 | 7 | 45 | 14.92 | 0.07 | 10.54 | 24.50 | 19.15 | 20.26 | 0.05 | 26.65 | 40.98 | 36.04 | 34.12 | 0.06 | 40.90 | 68.11 | 58.17 | 25.02 | 0.09 | 34.07 | 47.24 | 41.79 | 2010 | 543 | 2921 |
| *233* | 4 | 8 | 7 | 45 | 12.56 | 0.12 | 10.40 | 24.46 | 18.15 | 16.86 | 0.09 | 26.59 | 40.78 | 34.91 | 38.72 | 0.08 | 40.95 | 67.75 | 57.05 | 21.18 | 0.15 | 34.04 | 47.04 | 40.85 | 2006 | 568 | 2900 |
| *234* | 3 | 10 | 7 | 45 | 9.68 | 0.10 | 10.25 | 24.43 | 18.38 | 12.94 | 0.07 | 26.40 | 40.53 | 35.11 | 31.94 | 0.09 | 40.84 | 54.17 | 48.66 | 16.42 | 0.13 | 33.91 | 46.79 | 40.88 | 2025 | 594 | 2855 |
| *235* | 2 | 16 | 7 | 45 | 6.62 | 0.16 | 10.28 | 21.76 | 16.20 | 8.80 | 0.11 | 26.49 | 38.21 | 33.08 | 21.48 | 0.17 | 40.75 | 51.73 | 46.33 | 11.24 | 0.19 | 33.84 | 44.17 | 38.94 | 2044 | 614 | 2816 |
| *236* | 5 | 5 | 4 | 45 | 25.42 | 0.05 | 10.70 | 56.51 | 40.73 | 33.24 | 0.04 | 26.70 | 65.86 | 53.34 | 49.90 | 0.07 | 40.83 | 68.49 | 57.89 | 37.12 | 0.10 | 33.83 | 46.83 | 41.29 | 1916 | 357 | 3201 |
| *237* | 5 | 6 | 4 | 45 | 26.10 | 0.06 | 10.65 | 56.27 | 39.60 | 33.86 | 0.04 | 26.61 | 65.81 | 53.28 | 50.00 | 0.08 | 40.84 | 68.79 | 57.63 | 37.92 | 0.12 | 33.84 | 46.96 | 41.07 | 1910 | 344 | 3220 |
| *238* | 4 | 8 | 4 | 45 | 21.96 | 0.04 | 10.56 | 56.53 | 41.83 | 29.48 | 0.04 | 26.64 | 65.85 | 53.31 | 47.76 | 0.11 | 40.89 | 68.43 | 56.37 | 34.98 | 0.17 | 33.85 | 46.76 | 40.41 | 1931 | 393 | 3150 |
| *239* | 3 | 10 | 4 | 45 | 16.96 | 0.08 | 10.29 | 24.71 | 18.95 | 22.64 | 0.03 | 26.41 | 65.93 | 54.50 | 43.84 | 0.11 | 40.78 | 67.99 | 56.07 | 28.72 | 0.16 | 33.71 | 46.54 | 40.32 | 1979 | 446 | 3049 |
| *240* | 2 | 16 | 4 | 45 | 11.60 | 0.17 | 10.54 | 23.13 | 16.93 | 15.40 | 0.12 | 26.69 | 65.26 | 47.95 | 36.02 | 0.17 | 40.84 | 66.47 | 53.86 | 19.70 | 0.21 | 33.72 | 44.24 | 38.79 | 2005 | 518 | 2951 |
| *241* | 4 | 4 | 10 | 90 | 8.12 | 0.01 | 10.16 | 21.87 | 19.64 | 11.04 | 0.00 | 26.38 | 39.99 | 39.99 | 25.94 | 0.00 | 41.14 | 69.37 | 69.37 | 15.36 | 0.00 | 33.67 | 45.61 | 45.61 | 2053 | 678 | 2743 |
| *242* | 4 | 5 | 10 | 90 | 8.38 | 0.01 | 10.35 | 21.07 | 19.03 | 11.50 | 0.01 | 26.53 | 38.54 | 36.25 | 30.20 | 0.01 | 41.48 | 56.83 | 53.91 | 14.02 | 0.02 | 33.84 | 44.11 | 41.55 | 2040 | 656 | 2778 |
| *243* | 3 | 6 | 10 | 90 | 6.60 | 0.02 | 10.40 | 21.01 | 18.36 | 9.12 | 0.02 | 26.60 | 38.33 | 35.40 | 27.56 | 0.01 | 41.60 | 56.39 | 53.58 | 10.94 | 0.04 | 33.79 | 43.85 | 40.63 | 2042 | 657 | 2775 |
| *244* | 2 | 8 | 10 | 90 | 4.56 | 0.06 | 10.46 | 20.54 | 16.86 | 6.36 | 0.05 | 26.53 | 37.36 | 33.63 | 20.78 | 0.04 | 41.57 | 54.70 | 50.50 | 7.54 | 0.09 | 33.78 | 42.82 | 39.08 | 2050 | 664 | 2760 |
| *245* | 2 | 14 | 10 | 90 | 4.64 | 0.15 | 10.29 | 19.59 | 15.16 | 6.48 | 0.16 | 26.34 | 36.17 | 31.41 | 21.72 | 0.14 | 40.64 | 50.58 | 45.93 | 7.64 | 0.18 | 33.48 | 40.36 | 36.93 | 2045 | 659 | 2770 |
| *246* | 4 | 4 | 7 | 90 | 11.62 | 0.02 | 9.95 | 23.77 | 20.32 | 15.78 | 0.01 | 26.31 | 41.52 | 38.63 | 30.16 | 0.05 | 40.72 | 53.58 | 49.15 | 19.48 | 0.01 | 33.68 | 47.39 | 44.78 | 2037 | 602 | 2835 |
| *247* | 4 | 5 | 7 | 90 | 12.00 | 0.03 | 10.19 | 21.71 | 18.38 | 16.42 | 0.03 | 26.58 | 39.76 | 35.95 | 37.48 | 0.02 | 41.53 | 70.61 | 63.36 | 20.02 | 0.04 | 34.02 | 45.43 | 41.78 | 2024 | 593 | 2857 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *248* | 3 | 6 | 7 | 90 | 9.42 | 0.04 | 10.24 | 21.67 | 18.02 | 13.04 | 0.04 | 26.69 | 39.58 | 35.46 | 35.46 | 0.03 | 41.68 | 70.24 | 61.98 | 15.64 | 0.07 | 34.00 | 45.21 | 40.91 | 2037 | 602 | 2835 |
| *249* | 2 | 8 | 7 | 90 | 6.50 | 0.07 | 10.25 | 21.35 | 17.09 | 9.08 | 0.08 | 26.59 | 38.77 | 33.91 | 29.48 | 0.06 | 41.75 | 68.80 | 58.92 | 10.76 | 0.12 | 33.99 | 44.31 | 39.68 | 2041 | 625 | 2808 |
| *250* | 2 | 14 | 7 | 90 | 6.60 | 0.13 | 10.23 | 20.16 | 15.61 | 9.26 | 0.16 | 26.49 | 37.70 | 32.27 | 30.82 | 0.14 | 41.75 | 68.70 | 56.09 | 10.92 | 0.23 | 33.86 | 43.09 | 38.20 | 2045 | 614 | 2815 |
| *251* | 4 | 4 | 4 | 90 | 20.36 | 0.03 | 9.84 | 56.88 | 43.27 | 27.48 | 0.02 | 26.26 | 66.06 | 56.13 | 44.68 | 0.05 | 40.69 | 67.61 | 58.34 | 32.70 | 0.01 | 33.68 | 47.39 | 44.78 | 1963 | 426 | 3085 |
| *252* | 4 | 5 | 4 | 90 | 20.98 | 0.04 | 10.13 | 22.30 | 18.41 | 28.56 | 0.02 | 26.56 | 41.17 | 37.53 | 46.20 | 0.02 | 41.69 | 71.46 | 64.03 | 33.54 | 0.03 | 34.08 | 47.05 | 43.30 | 1925 | 418 | 3131 |
| *253* | 3 | 6 | 4 | 90 | 16.48 | 0.02 | 10.18 | 22.50 | 19.43 | 22.82 | 0.02 | 26.73 | 41.19 | 37.58 | 44.96 | 0.02 | 41.83 | 71.17 | 63.85 | 27.38 | 0.03 | 34.23 | 46.97 | 43.28 | 1999 | 461 | 3014 |
| *254* | 2 | 8 | 4 | 90 | 11.40 | 0.01 | 10.20 | 22.78 | 20.39 | 15.92 | 0.01 | 26.67 | 40.89 | 38.18 | 41.40 | 0.00 | 41.88 | 69.90 | 69.90 | 18.84 | 0.01 | 34.18 | 46.45 | 44.12 | 2007 | 536 | 2931 |
| *255* | 2 | 14 | 4 | 90 | 11.58 | 0.16 | 10.28 | 21.76 | 16.20 | 16.22 | 0.04 | 26.81 | 40.15 | 35.88 | 42.66 | 0.19 | 40.88 | 53.44 | 47.08 | 19.10 | 0.25 | 33.71 | 43.13 | 38.04 | 2006 | 519 | 2949 |
| *256* | 4 | 4 | 10 | 135 | 8.14 | 0.01 | 10.51 | 22.68 | 20.36 | 11.12 | 0.01 | 26.98 | 40.25 | 37.72 | 29.40 | 0.00 | 41.72 | 70.10 | 70.10 | 13.60 | 0.02 | 34.09 | 44.33 | 41.78 | 2053 | 678 | 2743 |
| *257* | 4 | 5 | 10 | 135 | 9.78 | 0.01 | 10.50 | 22.04 | 19.84 | 13.46 | 0.02 | 26.86 | 39.40 | 36.27 | 35.18 | 0.01 | 41.19 | 67.26 | 62.30 | 16.24 | 0.02 | 34.10 | 45.18 | 42.42 | 2040 | 656 | 2778 |
| *258* | 3 | 6 | 10 | 135 | 10.26 | 0.01 | 10.60 | 22.01 | 19.84 | 14.62 | 0.03 | 26.78 | 39.21 | 35.61 | 38.52 | 0.02 | 41.19 | 66.93 | 60.51 | 16.70 | 0.05 | 34.01 | 44.96 | 41.19 | 2042 | 657 | 2775 |
| *259* | 2 | 8 | 10 | 135 | 9.14 | 0.02 | 10.84 | 21.65 | 18.95 | 14.14 | 0.07 | 26.80 | 38.33 | 33.91 | 42.24 | 0.05 | 41.33 | 52.17 | 48.44 | 14.30 | 0.10 | 33.98 | 44.06 | 39.76 | 2050 | 664 | 2760 |
| *260* | 2 | 14 | 10 | 135 | 10.12 | 0.01 | 10.44 | 21.43 | 19.34 | 16.18 | 0.10 | 26.45 | 37.00 | 32.50 | 48.04 | 0.04 | 41.12 | 54.79 | 50.42 | 15.66 | 0.11 | 33.60 | 41.31 | 37.93 | 2045 | 659 | 2770 |
| *261* | 4 | 4 | 7 | 135 | 11.64 | 0.01 | 10.56 | 26.04 | 23.09 | 15.88 | 0.03 | 26.94 | 41.28 | 37.13 | 38.34 | 0.01 | 41.86 | 70.76 | 65.26 | 19.42 | 0.05 | 34.34 | 47.29 | 42.83 | 2037 | 602 | 2835 |
| *262* | 4 | 5 | 7 | 135 | 13.96 | 0.01 | 10.48 | 24.14 | 21.54 | 19.24 | 0.04 | 26.96 | 40.56 | 36.21 | 42.36 | 0.01 | 41.56 | 71.06 | 65.45 | 23.18 | 0.06 | 34.30 | 46.54 | 42.07 | 2024 | 593 | 2857 |
| *263* | 3 | 6 | 7 | 135 | 14.66 | 0.00 | 10.59 | 24.18 | 24.18 | 20.88 | 0.05 | 26.88 | 40.41 | 35.75 | 44.74 | 0.01 | 41.58 | 70.68 | 65.14 | 23.76 | 0.09 | 34.18 | 46.36 | 41.32 | 2037 | 602 | 2835 |
| *264* | 2 | 8 | 7 | 135 | 13.04 | 0.02 | 10.84 | 24.12 | 20.81 | 20.22 | 0.09 | 26.90 | 39.68 | 34.40 | 47.30 | 0.04 | 41.81 | 56.30 | 51.67 | 20.42 | 0.14 | 34.15 | 45.60 | 40.24 | 2041 | 625 | 2808 |
| *265* | 2 | 14 | 7 | 135 | 14.44 | 0.01 | 10.35 | 22.50 | 20.19 | 23.14 | 0.06 | 26.46 | 38.31 | 33.98 | 51.46 | 0.02 | 41.21 | 55.72 | 52.10 | 22.36 | 0.14 | 33.80 | 44.20 | 39.33 | 2045 | 614 | 2815 |
| *266* | 4 | 4 | 4 | 135 | 20.34 | 0.03 | 10.51 | 26.32 | 21.75 | 27.76 | 0.05 | 26.93 | 66.11 | 52.61 | 47.46 | 0.03 | 41.21 | 68.67 | 60.73 | 32.36 | 0.03 | 33.95 | 46.50 | 42.87 | 1963 | 426 | 3085 |
| *267* | 4 | 5 | 4 | 135 | 24.40 | 0.02 | 10.37 | 56.89 | 45.29 | 32.30 | 0.06 | 26.95 | 65.61 | 51.49 | 49.78 | 0.00 | 41.68 | 71.63 | 71.63 | 35.84 | 0.08 | 34.40 | 70.32 | 55.98 | 1925 | 418 | 3131 |
| *268* | 3 | 6 | 4 | 135 | 0.00 | 0.02 | 10.53 | 25.06 | 21.44 | 33.52 | 0.04 | 26.85 | 65.63 | 53.23 | 51.12 | 0.00 | 41.68 | 71.32 | 71.32 | 35.86 | 0.06 | 34.34 | 70.28 | 57.15 | 1999 | 461 | 3014 |
| *269* | 2 | 8 | 4 | 135 | 22.82 | 0.04 | 10.85 | 25.72 | 20.97 | 32.66 | 0.03 | 26.99 | 41.10 | 37.02 | 52.56 | 0.08 | 41.91 | 70.02 | 58.80 | 33.28 | 0.05 | 34.41 | 47.15 | 42.76 | 2007 | 536 | 2931 |
| *270* | 2 | 14 | 4 | 135 | 25.30 | 0.01 | 10.33 | 24.03 | 21.42 | 36.22 | 0.16 | 26.44 | 40.56 | 33.72 | 55.04 | 0.05 | 41.34 | 69.79 | 59.99 | 35.88 | 0.11 | 33.74 | 43.98 | 39.49 | 2006 | 519 | 2949 |
| *271* | 4 | 4 | 10 | 0 | 8.12 | 0.00 | 10.46 | 22.07 | 22.07 | 11.04 | 0.00 | 26.73 | 39.77 | 39.77 | 27.66 | 0.00 | 41.62 | 69.11 | 69.11 | 13.64 | 0.01 | 33.97 | 45.34 | 43.18 | 2053 | 678 | 2743 |
| *272* | 4 | 5 | 10 | 0 | 9.76 | 0.00 | 10.39 | 22.20 | 22.20 | 13.12 | 0.00 | 26.72 | 39.63 | 39.63 | 29.62 | 0.00 | 41.52 | 69.66 | 69.66 | 16.44 | 0.03 | 33.73 | 43.64 | 40.77 | 2040 | 656 | 2778 |
| *273* | 3 | 6 | 10 | 0 | 10.24 | 0.02 | 10.53 | 22.19 | 19.28 | 13.24 | 0.00 | 26.94 | 39.45 | 39.45 | 25.56 | 0.00 | 41.60 | 69.27 | 69.27 | 17.58 | 0.02 | 33.81 | 43.37 | 40.99 | 2042 | 657 | 2775 |
| *274* | 2 | 8 | 10 | 0 | 9.08 | 0.06 | 10.66 | 21.85 | 17.76 | 11.02 | 0.01 | 27.20 | 38.59 | 36.42 | 18.48 | 0.00 | 41.85 | 67.73 | 67.73 | 16.28 | 0.02 | 33.97 | 42.67 | 40.50 | 2050 | 664 | 2760 |
| *275* | 2 | 14 | 10 | 0 | 10.04 | 0.14 | 10.38 | 19.75 | 15.37 | 11.94 | 0.01 | 26.61 | 61.98 | 55.25 | 19.10 | 0.00 | 41.31 | 66.74 | 66.74 | 18.32 | 2.52 | 32.55 | 68.30 | 40.11 | 2045 | 659 | 2770 |
| *276* | 4 | 4 | 7 | 0 | 11.62 | 0.01 | 10.37 | 23.76 | 21.21 | 15.78 | 0.01 | 26.72 | 40.47 | 37.85 | 35.26 | 0.01 | 41.68 | 69.97 | 64.59 | 19.50 | 0.03 | 33.81 | 44.17 | 41.17 | 2037 | 602 | 2835 |
| *277* | 4 | 5 | 7 | 0 | 13.94 | 0.02 | 10.22 | 23.10 | 19.89 | 18.76 | 0.01 | 26.74 | 40.61 | 37.97 | 37.04 | 0.01 | 41.57 | 70.34 | 64.87 | 23.50 | 0.03 | 33.76 | 44.43 | 41.34 | 2024 | 593 | 2857 |
| *278* | 3 | 6 | 7 | 0 | 11.46 | 0.04 | 10.37 | 23.11 | 19.04 | 18.92 | 0.00 | 26.88 | 40.46 | 40.46 | 34.08 | 0.00 | 41.66 | 69.96 | 69.96 | 24.34 | 0.03 | 33.83 | 44.19 | 41.19 | 2037 | 602 | 2835 |
| *279* | 2 | 8 | 7 | 0 | 12.96 | 0.08 | 10.44 | 22.93 | 17.94 | 15.72 | 0.02 | 27.06 | 39.73 | 36.57 | 26.40 | 0.01 | 41.96 | 68.48 | 63.43 | 23.28 | 0.02 | 33.96 | 43.52 | 41.14 | 2041 | 625 | 2808 |
| *280* | 2 | 14 | 7 | 0 | 14.36 | 0.10 | 10.27 | 53.88 | 35.29 | 17.06 | 0.00 | 26.50 | 62.65 | 62.65 | 27.28 | 0.00 | 41.42 | 67.71 | 67.71 | 26.18 | 0.01 | 33.80 | 66.58 | 60.34 | 2045 | 614 | 2815 |
| *281* | 4 | 4 | 4 | 0 | 20.34 | 0.02 | 10.30 | 55.88 | 44.51 | 27.46 | 0.03 | 26.72 | 65.39 | 54.20 | 44.66 | 0.02 | 41.84 | 71.03 | 63.75 | 32.68 | 0.03 | 33.76 | 44.87 | 41.66 | 1963 | 426 | 3085 |
| *282* | 4 | 5 | 4 | 0 | 24.40 | 0.02 | 10.14 | 55.74 | 44.37 | 31.22 | 0.02 | 26.54 | 65.14 | 55.51 | 45.94 | 0.02 | 41.70 | 71.06 | 63.74 | 36.44 | 0.03 | 33.71 | 45.18 | 41.86 | 1925 | 418 | 3131 |
| *283* | 3 | 6 | 4 | 0 | 25.40 | 0.01 | 10.26 | 55.92 | 47.23 | 31.04 | 0.02 | 26.67 | 65.13 | 55.54 | 44.12 | 0.01 | 41.80 | 70.74 | 65.23 | 37.08 | 0.03 | 33.76 | 44.96 | 41.72 | 1999 | 461 | 3014 |
| *284* | 2 | 8 | 4 | 0 | 22.70 | 0.02 | 10.30 | 56.21 | 44.76 | 27.36 | 0.03 | 26.90 | 64.82 | 53.85 | 39.60 | 0.02 | 42.17 | 69.39 | 62.60 | 35.72 | 0.01 | 33.79 | 44.32 | 42.32 | 2007 | 536 | 2931 |
| *285* | 2 | 14 | 4 | 0 | 25.14 | 0.12 | 10.22 | 53.87 | 34.28 | 29.66 | 0.01 | 26.43 | 63.46 | 56.41 | 40.60 | 0.02 | 41.61 | 69.19 | 62.31 | 38.80 | 0.02 | 33.85 | 67.31 | 58.96 | 2006 | 519 | 2949 |
| *286* | 4 | 4 | 10 | 45 | 8.14 | 0.01 | 10.22 | 23.76 | 21.18 | 11.12 | 0.00 | 26.81 | 40.38 | 40.38 | 29.36 | 0.05 | 40.91 | 52.89 | 48.76 | 13.60 | 0.08 | 33.81 | 44.36 | 40.15 | 2053 | 678 | 2743 |
| *287* | 4 | 5 | 10 | 45 | 8.40 | 0.01 | 10.51 | 23.89 | 21.34 | 11.40 | 0.01 | 26.59 | 39.63 | 37.15 | 29.62 | 0.05 | 40.86 | 53.30 | 49.01 | 14.10 | 0.04 | 33.83 | 44.46 | 41.06 | 2040 | 656 | 2778 |
| *288* | 3 | 6 | 10 | 45 | 6.60 | 0.02 | 10.58 | 23.92 | 20.59 | 8.86 | 0.02 | 26.59 | 39.45 | 36.24 | 22.36 | 0.05 | 40.84 | 52.88 | 48.73 | 11.12 | 0.04 | 33.84 | 44.22 | 40.90 | 2042 | 657 | 2775 |
| *289* | 2 | 8 | 10 | 45 | 4.56 | 0.06 | 10.63 | 23.73 | 18.94 | 6.08 | 0.05 | 26.68 | 38.59 | 34.49 | 15.00 | 0.05 | 40.78 | 51.72 | 47.95 | 7.72 | 0.05 | 33.85 | 43.58 | 40.23 | 2050 | 664 | 2760 |
| *290* | 2 | 14 | 10 | 45 | 4.64 | 0.17 | 10.30 | 20.88 | 15.67 | 6.14 | 0.12 | 26.43 | 36.71 | 32.10 | 15.02 | 0.11 | 40.61 | 50.57 | 46.21 | 7.86 | 0.16 | 33.55 | 41.35 | 37.57 | 2045 | 659 | 2770 |
| *291* | 4 | 4 | 7 | 45 | 11.64 | 0.01 | 10.09 | 25.86 | 22.86 | 15.88 | 0.01 | 26.78 | 41.63 | 38.80 | 38.32 | 0.05 | 40.91 | 66.81 | 57.89 | 19.42 | 0.02 | 34.15 | 47.31 | 44.03 | 2037 | 602 | 2835 |
| *292* | 4 | 5 | 7 | 45 | 12.00 | 0.03 | 10.39 | 24.65 | 20.52 | 16.26 | 0.02 | 26.55 | 40.57 | 37.07 | 38.48 | 0.05 | 40.86 | 53.99 | 49.47 | 20.12 | 0.04 | 34.00 | 46.79 | 42.70 | 2024 | 593 | 2857 |
| *293* | 3 | 6 | 7 | 45 | 9.40 | 0.04 | 10.50 | 24.71 | 20.17 | 12.64 | 0.04 | 26.56 | 40.42 | 35.99 | 31.80 | 0.06 | 40.92 | 53.58 | 48.95 | 15.90 | 0.07 | 34.03 | 46.62 | 41.79 | 2037 | 602 | 2835 |
| *294* | 2 | 8 | 7 | 45 | 6.50 | 0.08 | 10.49 | 24.69 | 19.02 | 8.68 | 0.07 | 26.63 | 39.69 | 34.68 | 21.42 | 0.07 | 40.86 | 52.45 | 48.01 | 11.02 | 0.12 | 34.00 | 45.89 | 40.55 | 2041 | 625 | 2808 |
| *295* | 2 | 14 | 7 | 45 | 6.60 | 0.17 | 10.34 | 21.79 | 16.16 | 8.80 | 0.10 | 26.52 | 38.23 | 33.24 | 21.48 | 0.15 | 40.77 | 51.73 | 46.51 | 11.22 | 0.18 | 33.86 | 44.18 | 39.03 | 2045 | 614 | 2815 |
| *296* | 4 | 4 | 4 | 45 | 20.34 | 0.02 | 10.04 | 58.29 | 46.25 | 27.78 | 0.02 | 26.67 | 66.36 | 56.46 | 47.46 | 0.06 | 40.83 | 67.60 | 57.82 | 32.40 | 0.03 | 34.13 | 70.81 | 60.20 | 1963 | 426 | 3085 |
| *297* | 4 | 5 | 4 | 45 | 21.00 | 0.02 | 10.36 | 24.77 | 21.18 | 28.46 | 0.02 | 26.44 | 65.90 | 56.06 | 47.58 | 0.07 | 40.78 | 67.84 | 57.47 | 33.44 | 0.09 | 33.79 | 46.52 | 41.26 | 1925 | 418 | 3131 |
| *298* | 3 | 6 | 4 | 45 | 16.48 | 0.01 | 10.52 | 25.12 | 22.34 | 22.14 | 0.02 | 26.58 | 65.94 | 56.12 | 43.76 | 0.07 | 40.86 | 67.49 | 57.28 | 27.74 | 0.10 | 33.81 | 46.34 | 41.00 | 1999 | 461 | 3014 |
| *299* | 2 | 8 | 4 | 45 | 11.40 | 0.02 | 10.52 | 25.80 | 21.99 | 15.18 | 0.02 | 26.71 | 65.77 | 56.03 | 35.94 | 0.10 | 40.90 | 66.51 | 55.59 | 19.32 | 0.14 | 33.81 | 45.81 | 40.20 | 2007 | 536 | 2931 |
| *300* | 2 | 14 | 4 | 45 | 11.58 | 0.09 | 10.63 | 23.13 | 17.96 | 15.36 | 0.08 | 26.72 | 65.26 | 49.87 | 36.02 | 0.16 | 40.86 | 66.47 | 54.06 | 19.64 | 0.20 | 33.73 | 44.24 | 38.85 | 2006 | 519 | 2949 |
| *301* | 3 | 3 | 10 | 90 | 6.10 | 0.01 | 10.28 | 21.79 | 19.60 | 8.28 | 0.00 | 26.57 | 39.61 | 39.61 | 20.78 | 0.00 | 41.32 | 55.46 | 55.46 | 10.22 | 0.00 | 33.73 | 45.17 | 45.17 | 2064 | 725 | 2685 |
| *302* | 3 | 4 | 10 | 90 | 6.34 | 0.00 | 10.23 | 19.82 | 19.82 | 8.70 | 0.00 | 26.26 | 36.49 | 36.49 | 24.42 | 0.05 | 40.55 | 50.57 | 47.12 | 10.58 | 0.04 | 33.41 | 40.36 | 38.14 | 2056 | 681 | 2737 |
| *303* | 2 | 5 | 10 | 90 | 4.46 | 0.01 | 10.71 | 19.42 | 17.76 | 6.20 | 0.02 | 26.55 | 35.69 | 33.41 | 19.44 | 0.04 | 40.74 | 49.73 | 46.86 | 7.40 | 0.03 | 33.49 | 39.79 | 37.97 | 2056 | 679 | 2739 |
| *304* | 2 | 6 | 10 | 90 | 4.52 | 0.02 | 10.44 | 19.49 | 17.23 | 6.28 | 0.02 | 26.20 | 35.84 | 33.44 | 20.02 | 0.04 | 40.52 | 49.97 | 46.95 | 7.46 | 0.04 | 33.37 | 39.95 | 37.85 | 2051 | 676 | 2747 |
| *305* | 1 | 10 | 10 | 90 | 2.32 | 0.08 | 10.59 | 21.29 | 17.02 | 3.26 | 0.11 | 26.79 | 38.52 | 33.38 | 11.04 | 0.07 | 41.37 | 53.11 | 48.61 | 3.84 | 0.12 | 33.94 | 44.04 | 39.51 | 2055 | 680 | 2739 |
| *306* | 3 | 3 | 7 | 90 | 8.72 | 0.01 | 10.02 | 23.85 | 21.22 | 11.84 | 0.00 | 26.46 | 41.21 | 41.21 | 29.20 | 0.06 | 40.79 | 52.58 | 48.27 | 14.62 | 0.01 | 33.73 | 47.01 | 44.48 | 2039 | 656 | 2779 |
| *307* | 3 | 4 | 7 | 90 | 9.08 | 0.01 | 10.01 | 20.48 | 18.49 | 12.44 | 0.01 | 26.31 | 38.07 | 35.83 | 32.30 | 0.01 | 41.22 | 69.15 | 63.84 | 15.12 | 0.02 | 33.65 | 43.40 | 40.97 | 2044 | 626 | 2804 |
| *308* | 2 | 5 | 7 | 90 | 6.36 | 0.03 | 10.58 | 20.22 | 17.43 | 8.84 | 0.04 | 26.67 | 37.42 | 33.98 | 27.60 | 0.03 | 42.07 | 68.02 | 60.51 | 10.56 | 0.06 | 33.96 | 42.66 | 39.48 | 2046 | 639 | 2789 |
| *309* | 2 | 6 | 7 | 90 | 6.42 | 0.05 | 10.13 | 20.26 | 16.77 | 8.96 | 0.05 | 26.24 | 37.53 | 33.64 | 28.42 | 0.04 | 41.32 | 68.22 | 59.62 | 10.66 | 0.07 | 33.65 | 42.79 | 39.29 | 2046 | 631 | 2797 |
| *310* | 1 | 10 | 7 | 90 | 3.32 | 0.07 | 10.25 | 23.65 | 18.51 | 4.66 | 0.11 | 26.65 | 40.26 | 34.30 | 15.76 | 0.12 | 40.77 | 51.26 | 46.55 | 5.50 | 0.12 | 33.94 | 46.00 | 40.59 | 2042 | 657 | 2775 |
| *311* | 3 | 3 | 4 | 90 | 12.74 | 0.02 | 9.87 | 25.49 | 21.59 | 17.16 | 0.02 | 26.37 | 42.02 | 38.12 | 37.66 | 0.05 | 40.79 | 53.53 | 49.14 | 21.24 | 0.01 | 33.73 | 47.01 | 44.48 | 2042 | 657 | 2775 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *312* | 3 | 4 | 4 | 90 | 15.86 | 0.02 | 9.98 | 22.17 | 19.13 | 21.76 | 0.02 | 26.33 | 40.48 | 36.95 | 42.60 | 0.06 | 40.72 | 53.45 | 48.80 | 26.46 | 0.04 | 33.61 | 43.17 | 40.11 | 2012 | 485 | 2977 |
| *313* | 2 | 5 | 4 | 90 | 11.16 | 0.04 | 10.68 | 22.18 | 18.50 | 15.50 | 0.05 | 26.92 | 40.09 | 35.55 | 39.62 | 0.05 | 40.96 | 52.67 | 48.64 | 18.48 | 0.06 | 33.72 | 42.71 | 39.43 | 1999 | 564 | 2911 |
| *314* | 2 | 6 | 4 | 90 | 11.26 | 0.02 | 10.27 | 22.10 | 19.15 | 15.68 | 0.01 | 26.47 | 40.11 | 37.51 | 40.40 | 0.07 | 40.76 | 52.88 | 48.23 | 18.64 | 0.07 | 33.61 | 42.83 | 39.30 | 2009 | 547 | 2918 |
| *315* | 1 | 10 | 4 | 90 | 5.82 | 0.04 | 10.02 | 25.68 | 20.67 | 8.16 | 0.05 | 26.55 | 41.26 | 36.19 | 27.60 | 0.14 | 40.80 | 52.22 | 46.88 | 9.60 | 0.12 | 33.94 | 46.00 | 40.59 | 2037 | 602 | 2835 |
| *316* | 3 | 3 | 10 | 135 | 6.10 | 0.01 | 10.77 | 22.67 | 20.41 | 8.34 | 0.00 | 27.03 | 39.87 | 39.87 | 22.10 | 0.00 | 41.89 | 56.23 | 56.23 | 10.20 | 0.02 | 34.15 | 43.87 | 41.45 | 2064 | 725 | 2685 |
| *317* | 3 | 4 | 10 | 135 | 7.70 | 0.01 | 10.56 | 21.63 | 19.52 | 10.66 | 0.01 | 26.82 | 37.32 | 35.32 | 29.22 | 0.00 | 41.65 | 68.33 | 68.33 | 12.78 | 0.02 | 33.74 | 41.31 | 39.42 | 2056 | 681 | 2737 |
| *318* | 2 | 5 | 10 | 135 | 7.74 | 0.01 | 10.76 | 21.37 | 19.35 | 11.32 | 0.02 | 26.82 | 36.57 | 34.14 | 34.14 | 0.00 | 41.62 | 53.84 | 53.84 | 12.40 | 0.02 | 33.66 | 40.81 | 39.03 | 2056 | 679 | 2739 |
| *319* | 2 | 6 | 10 | 135 | 8.36 | 0.01 | 10.44 | 21.42 | 19.33 | 12.56 | 0.03 | 26.83 | 36.70 | 33.84 | 37.76 | 0.00 | 41.51 | 54.10 | 54.10 | 13.24 | 0.01 | 33.72 | 40.94 | 39.57 | 2051 | 676 | 2747 |
| *320* | 1 | 10 | 10 | 135 | 5.26 | 0.01 | 11.18 | 22.28 | 20.17 | 8.52 | 0.11 | 27.15 | 38.78 | 33.69 | 41.84 | 0.05 | 41.75 | 53.74 | 49.61 | 8.08 | 0.07 | 34.14 | 43.26 | 39.76 | 2055 | 680 | 2739 |
| *321* | 3 | 3 | 7 | 135 | 3.38 | 0.00 | 10.83 | 26.27 | 26.27 | 4.46 | 0.01 | 26.90 | 40.95 | 38.28 | 29.28 | 0.00 | 42.06 | 69.84 | 69.84 | 5.74 | 0.01 | 34.32 | 46.95 | 44.55 | 2039 | 656 | 2779 |
| *322* | 3 | 4 | 7 | 135 | 11.02 | 0.00 | 10.46 | 22.81 | 22.81 | 15.24 | 0.02 | 26.90 | 38.68 | 35.74 | 38.06 | 0.00 | 41.82 | 69.16 | 69.16 | 18.26 | 0.04 | 34.20 | 44.51 | 41.21 | 2044 | 626 | 2804 |
| *323* | 2 | 5 | 7 | 135 | 11.06 | 0.02 | 10.72 | 22.73 | 19.73 | 16.18 | 0.05 | 26.93 | 38.05 | 34.22 | 41.44 | 0.02 | 41.73 | 54.85 | 51.58 | 17.72 | 0.08 | 34.13 | 43.86 | 39.97 | 2046 | 639 | 2789 |
| *324* | 2 | 6 | 7 | 135 | 11.94 | 0.00 | 10.27 | 22.74 | 22.74 | 17.96 | 0.05 | 26.88 | 38.16 | 34.27 | 44.04 | 0.01 | 41.62 | 55.10 | 52.53 | 18.94 | 0.09 | 34.10 | 43.97 | 39.89 | 2046 | 631 | 2797 |
| *325* | 1 | 10 | 7 | 135 | 7.50 | 0.02 | 11.23 | 26.31 | 22.55 | 12.16 | 0.13 | 26.95 | 39.95 | 33.99 | 46.82 | 0.09 | 41.94 | 54.65 | 49.39 | 11.58 | 0.19 | 34.25 | 46.01 | 40.06 | 2042 | 657 | 2775 |
| *326* | 3 | 3 | 4 | 135 | 15.26 | 0.02 | 10.81 | 27.33 | 23.21 | 20.86 | 0.04 | 26.97 | 66.22 | 53.67 | 43.36 | 0.02 | 41.25 | 68.03 | 61.35 | 25.52 | 0.03 | 33.96 | 46.12 | 42.60 | 2042 | 657 | 2775 |
| *327* | 3 | 4 | 4 | 135 | 19.26 | 0.02 | 10.42 | 24.28 | 20.82 | 26.66 | 0.05 | 26.98 | 65.26 | 52.07 | 47.24 | 0.01 | 42.01 | 70.26 | 64.88 | 30.70 | 0.02 | 33.85 | 44.04 | 41.50 | 2012 | 485 | 2977 |
| *328* | 2 | 5 | 4 | 135 | 19.36 | 0.03 | 10.87 | 24.49 | 20.55 | 27.70 | 0.05 | 27.11 | 40.51 | 35.89 | 49.14 | 0.01 | 41.88 | 69.10 | 63.92 | 29.68 | 0.02 | 33.77 | 43.62 | 41.16 | 1999 | 564 | 2911 |
| *329* | 2 | 6 | 4 | 135 | 20.90 | 0.01 | 10.14 | 24.36 | 21.65 | 29.92 | 0.06 | 26.99 | 40.52 | 35.58 | 50.66 | 0.00 | 41.76 | 69.30 | 69.30 | 31.28 | 0.03 | 33.82 | 43.72 | 40.86 | 2009 | 547 | 2918 |
| *330* | 1 | 10 | 4 | 135 | 13.14 | 0.00 | 11.09 | 27.81 | 27.81 | 21.28 | 0.02 | 26.98 | 41.35 | 37.77 | 52.20 | 0.01 | 41.41 | 66.38 | 61.63 | 20.26 | 0.17 | 33.96 | 45.52 | 39.83 | 2037 | 602 | 2835 |
| *331* | 3 | 3 | 10 | 0 | 6.10 | 0.01 | 10.90 | 22.00 | 19.89 | 8.28 | 0.00 | 26.97 | 39.33 | 39.33 | 21.24 | 0.00 | 41.87 | 55.14 | 55.14 | 10.22 | 0.00 | 34.00 | 44.83 | 44.83 | 2064 | 725 | 2685 |
| *332* | 3 | 4 | 10 | 0 | 7.70 | 0.01 | 10.35 | 19.99 | 18.16 | 10.30 | 0.00 | 26.57 | 37.13 | 37.13 | 23.40 | 0.00 | 41.51 | 67.21 | 67.21 | 13.00 | 0.00 | 33.76 | 42.31 | 42.31 | 2056 | 681 | 2737 |
| *333* | 2 | 5 | 10 | 0 | 7.70 | 0.01 | 10.53 | 19.59 | 17.87 | 9.70 | 0.00 | 26.77 | 36.27 | 36.27 | 17.62 | 0.00 | 41.78 | 65.89 | 65.89 | 13.44 | 0.01 | 33.91 | 41.36 | 39.94 | 2056 | 679 | 2739 |
| *334* | 2 | 6 | 10 | 0 | 8.32 | 0.02 | 10.26 | 19.66 | 17.32 | 10.28 | 0.00 | 26.53 | 36.43 | 36.43 | 18.00 | 0.00 | 41.26 | 66.13 | 66.13 | 14.70 | 0.00 | 33.71 | 41.53 | 41.53 | 2051 | 676 | 2747 |
| *335* | 1 | 10 | 10 | 0 | 5.22 | 0.13 | 11.15 | 21.50 | 16.75 | 6.16 | 0.00 | 27.26 | 38.13 | 38.13 | 9.68 | 0.00 | 41.86 | 66.01 | 66.01 | 9.56 | 0.01 | 34.45 | 43.57 | 41.83 | 2055 | 680 | 2739 |
| *336* | 3 | 3 | 7 | 0 | 8.72 | 0.00 | 10.81 | 23.80 | 23.80 | 11.84 | 0.00 | 26.94 | 40.06 | 40.06 | 29.20 | 0.00 | 41.98 | 69.05 | 69.05 | 14.62 | 0.03 | 33.80 | 43.63 | 40.79 | 2039 | 656 | 2779 |
| *337* | 3 | 4 | 7 | 0 | 11.00 | 0.01 | 10.24 | 20.93 | 18.90 | 14.72 | 0.00 | 26.63 | 38.03 | 38.03 | 31.62 | 0.00 | 41.61 | 68.18 | 68.18 | 18.56 | 0.01 | 34.00 | 43.37 | 41.59 | 2044 | 626 | 2804 |
| *338* | 2 | 5 | 7 | 0 | 11.02 | 0.04 | 10.43 | 20.62 | 17.36 | 13.86 | 0.01 | 26.93 | 37.25 | 35.29 | 25.16 | 0.00 | 42.01 | 66.91 | 66.91 | 19.22 | 0.02 | 34.26 | 42.46 | 40.41 | 2046 | 639 | 2789 |
| *339* | 2 | 6 | 7 | 0 | 11.88 | 0.03 | 10.08 | 20.67 | 17.61 | 8.68 | 0.00 | 26.47 | 37.39 | 37.39 | 25.70 | 0.00 | 41.34 | 67.14 | 67.14 | 21.02 | 0.00 | 33.87 | 42.62 | 42.62 | 2046 | 631 | 2797 |
| *340* | 1 | 10 | 7 | 0 | 7.46 | 0.14 | 11.04 | 23.52 | 17.68 | 8.80 | 0.01 | 27.19 | 63.67 | 56.73 | 13.82 | 0.01 | 42.13 | 66.94 | 62.22 | 13.66 | 0.03 | 34.11 | 42.89 | 40.35 | 2042 | 657 | 2775 |
| *341* | 3 | 3 | 4 | 0 | 15.26 | 0.02 | 10.79 | 23.93 | 20.65 | 20.72 | 0.02 | 26.98 | 41.04 | 37.53 | 40.30 | 0.02 | 42.16 | 70.27 | 63.26 | 25.56 | 0.03 | 33.73 | 44.33 | 41.26 | 2042 | 657 | 2775 |
| *342* | 3 | 4 | 4 | 0 | 19.26 | 0.02 | 10.16 | 54.09 | 43.13 | 25.66 | 0.02 | 26.63 | 63.78 | 54.51 | 42.20 | 0.02 | 41.79 | 69.67 | 62.72 | 31.32 | 0.03 | 34.09 | 67.60 | 57.91 | 2012 | 485 | 2977 |
| *343* | 2 | 5 | 4 | 0 | 19.28 | 0.05 | 10.52 | 53.94 | 38.98 | 24.16 | 0.02 | 27.00 | 63.21 | 54.18 | 38.16 | 0.01 | 42.34 | 68.44 | 63.47 | 31.40 | 0.03 | 34.33 | 66.90 | 57.48 | 1999 | 564 | 2911 |
| *344* | 2 | 6 | 4 | 0 | 20.80 | 0.01 | 9.93 | 53.92 | 45.55 | 25.58 | 0.01 | 26.32 | 63.28 | 56.25 | 38.78 | 0.01 | 41.48 | 68.65 | 63.48 | 33.32 | 0.02 | 33.80 | 67.01 | 58.73 | 2009 | 547 | 2918 |
| *345* | 1 | 10 | 4 | 0 | 13.04 | 0.03 | 10.98 | 56.25 | 43.15 | 15.40 | 0.00 | 27.25 | 64.60 | 64.60 | 24.18 | 0.00 | 42.44 | 68.24 | 68.24 | 23.92 | 0.04 | 33.88 | 67.02 | 56.42 | 2037 | 602 | 2835 |
| *346* | 3 | 3 | 10 | 45 | 6.10 | 0.01 | 10.49 | 23.82 | 21.28 | 8.34 | 0.00 | 27.10 | 40.03 | 40.03 | 22.10 | 0.05 | 40.96 | 51.90 | 48.13 | 10.20 | 0.07 | 33.94 | 43.91 | 40.09 | 2064 | 725 | 2685 |
| *347* | 3 | 4 | 10 | 45 | 6.34 | 0.01 | 10.13 | 21.09 | 19.00 | 8.60 | 0.00 | 26.54 | 37.03 | 37.03 | 22.22 | 0.05 | 40.70 | 50.56 | 47.16 | 10.66 | 0.04 | 33.65 | 41.36 | 38.89 | 2056 | 681 | 2737 |
| *348* | 2 | 5 | 10 | 45 | 4.46 | 0.01 | 10.71 | 20.79 | 18.87 | 5.96 | 0.01 | 26.53 | 36.27 | 34.42 | 14.94 | 0.04 | 40.66 | 49.72 | 46.82 | 7.54 | 0.03 | 33.57 | 40.86 | 38.75 | 2056 | 679 | 2739 |
| *349* | 2 | 6 | 10 | 45 | 4.50 | 0.02 | 10.17 | 50.21 | 40.22 | 6.02 | 0.02 | 26.41 | 36.41 | 33.92 | 14.96 | 0.04 | 40.52 | 49.95 | 46.93 | 7.62 | 0.03 | 33.52 | 41.00 | 38.84 | 2051 | 676 | 2747 |
| *350* | 1 | 10 | 10 | 45 | 2.32 | 0.11 | 10.96 | 23.55 | 18.04 | 3.08 | 0.11 | 27.30 | 39.01 | 33.88 | 7.54 | 0.08 | 40.83 | 50.60 | 46.70 | 3.96 | 0.13 | 34.03 | 43.31 | 39.05 | 2055 | 680 | 2739 |
| *351* | 3 | 3 | 7 | 45 | 8.70 | 0.00 | 10.28 | 26.08 | 26.08 | 11.92 | 0.01 | 27.07 | 41.34 | 38.62 | 31.38 | 0.06 | 41.03 | 52.64 | 48.40 | 14.58 | 0.01 | 34.40 | 46.97 | 44.58 | 2039 | 656 | 2779 |
| *352* | 3 | 4 | 7 | 45 | 9.06 | 0.01 | 10.03 | 22.10 | 19.80 | 12.28 | 0.01 | 26.59 | 38.59 | 36.31 | 31.56 | 0.05 | 40.84 | 51.73 | 47.98 | 15.24 | 0.02 | 34.00 | 44.48 | 41.87 | 2044 | 626 | 2804 |
| *353* | 2 | 5 | 7 | 45 | 6.36 | 0.04 | 10.64 | 21.96 | 18.34 | 8.54 | 0.04 | 26.64 | 37.98 | 34.35 | 21.34 | 0.05 | 40.85 | 50.92 | 47.45 | 10.76 | 0.06 | 33.98 | 43.85 | 40.24 | 2046 | 639 | 2789 |
| *354* | 2 | 6 | 7 | 45 | 6.42 | 0.05 | 10.06 | 21.98 | 17.87 | 8.60 | 0.03 | 26.39 | 38.08 | 34.70 | 21.38 | 0.05 | 40.67 | 51.15 | 47.54 | 10.88 | 0.06 | 33.79 | 43.96 | 40.24 | 2046 | 631 | 2797 |
| *355* | 1 | 10 | 7 | 45 | 3.32 | 0.11 | 10.64 | 26.11 | 19.33 | 4.40 | 0.12 | 27.23 | 40.41 | 34.50 | 10.76 | 0.12 | 40.91 | 51.35 | 46.67 | 5.66 | 0.18 | 34.41 | 46.05 | 40.24 | 2042 | 657 | 2775 |
| *356* | 3 | 3 | 4 | 45 | 15.26 | 0.02 | 10.16 | 27.67 | 23.30 | 20.84 | 0.02 | 27.10 | 66.50 | 56.67 | 43.34 | 0.06 | 40.97 | 66.74 | 57.33 | 25.48 | 0.03 | 34.49 | 70.79 | 60.29 | 2042 | 657 | 2775 |
| *357* | 3 | 4 | 4 | 45 | 15.86 | 0.02 | 10.02 | 23.39 | 20.05 | 21.48 | 0.02 | 26.58 | 65.53 | 55.81 | 43.54 | 0.06 | 40.83 | 66.48 | 57.11 | 26.64 | 0.05 | 33.80 | 44.31 | 40.69 | 2012 | 485 | 2977 |
| *358* | 2 | 5 | 4 | 45 | 11.16 | 0.06 | 10.74 | 23.53 | 18.86 | 14.92 | 0.04 | 26.95 | 65.24 | 53.00 | 35.78 | 0.05 | 40.96 | 65.79 | 57.24 | 18.86 | 0.05 | 33.78 | 43.90 | 40.41 | 1999 | 564 | 2911 |
| *359* | 2 | 6 | 4 | 45 | 11.26 | 0.00 | 10.20 | 23.42 | 23.42 | 15.04 | 0.01 | 26.39 | 65.25 | 57.86 | 35.84 | 0.06 | 40.74 | 65.98 | 56.76 | 19.06 | 0.06 | 33.68 | 44.00 | 40.23 | 2009 | 547 | 2918 |
| *360* | 1 | 10 | 4 | 45 | 5.80 | 0.09 | 10.49 | 28.20 | 20.88 | 7.72 | 0.01 | 27.25 | 41.77 | 39.01 | 16.82 | 0.14 | 40.93 | 52.25 | 46.95 | 9.88 | 0.02 | 34.57 | 47.42 | 44.21 | 2037 | 602 | 2835 |

# Appendix G: Thermal comfort survey results

Part. = Participant reference name
Tg. = Globe temperature
Therm. Sen. = Thermal sensation (3: very hot, 2: hot, 1: slightly hot, 0: comfortable, -1: slightly cold, -2: cold, -3: very cold)
In/O: IN: Indoor space, OUT: Outdoor space

| Part. | Date | Tg | In/O | Therm. Sen. | Part. | Date | Tg | In/O | Therm. Sen. | Part. | Date | Tg | In/O | Therm. Sen. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ma** | 19-Nov | 22.8 | IN | 0 | R | 29-Jan | 10 | OUT | -2 | R | 10-Jul | 34.2 | OUT | 1 |
| **as** | 19-Nov | 22.7 | IN | 0 | A | 29-Jan | 10 | OUT | -2 | M | 10-Jul | 34.2 | OUT | 1 |
| **ma** | 20-Nov | 22.6 | IN | -1 | R | 31-Jan | 17.3 | IN | 0 | R | 10-Jul | 29.3 | IN | 0 |
| **bs** | 20-Nov | 23.1 | IN | -1 | W | 31-Jan | 17.3 | IN | 0 | W | 10-Jul | 29.3 | IN | 0 |
| **as** | 20-Nov | 232 | IN | -1 | M | 31-Jan | 17.3 | IN | 0 | R | 11-Jul | 31.1 | IN | 0 |
| **as** | 20-Nov | 23.3 | IN | -1 | R | 31-Jan | 11 | OUT | -1 | R | 11-Jul | 34.9 | OUT | 1 |
| **ja** | 21-Nov | 23.4 | IN | -1 | A | 31-Jan | 11 | OUT | -1 | W | 11-Jul | 34.9 | OUT | 1 |
| **bs** | 21-Nov | 22 | IN | 0 | R | 02-Jan | 15.5 | IN | 0 | R | 12-Jul | 25.8 | IN | 0 |
| **ma** | 21-Nov | 22.6 | IN | 0 | A | 02-Jan | 15.5 | IN | 0 | W | 12-Jul | 25.8 | IN | 0 |
| **as** | 21-Nov | 23.1 | IN | -1 | M | 02-Jan | 15.5 | IN | 0 | R | 12-Jul | 34.6 | OUT | 1 |
| **ma** | 22-Nov | 22.7 | IN | 0 | R | 02-Jan | 10.2 | IN | -1 | W | 12-Jul | 34.6 | OUT | 1 |
| **as** | 22-Nov | 22.8 | IN | 0 | W | 02-Jan | 10.2 | IN | -1 | R | 13-Apr | 25.8 | IN | 0 |
| **bs** | 19-Jan | 22.9 | IN | 0 | A | 02-Jan | 10.2 | IN | -1 | W | 13-Apr | 25.8 | IN | 0 |
| **ma** | 22-Nov | 22.3 | IN | 0 | R | 02-Feb | 17.4 | IN | 0 | R | 13-Jul | 38.1 | OUT | 1 |
| **ma** | 23-Nov | 21.7 | IN | 0 | A | 02-Feb | 17.4 | IN | 0 | W | 13-Jul | 38.1 | OUT | 1 |
| **ma** | 23-Nov | 22 | IN | 0 | R | 02-Feb | 16.3 | OUT | 0 | A | 13-Jul | 38.1 | OUT | 1 |
| **as** | 23-Nov | 21.8 | IN | 0 | A | 02-Feb | 16.3 | OUT | 0 | R | 14-Jul | 27 | IN | 0 |
| **ma** | 23-Nov | 21.2 | IN | 0 | R | 04-Feb | 16.8 | IN | 0 | W | 14-Jul | 27 | IN | 0 |
| **ma** | 23-Nov | 21.2 | IN | 0 | A | 04-Feb | 16.8 | IN | 0 | R | 14-Jul | 31 | OUT | 1 |
| **as** | 23-Nov | 21.6 | IN | -1 | M | 04-Feb | 16.8 | IN | 0 | W | 14-Jul | 31 | OUT | 1 |
| **ma** | 24-Nov | 21.7 | IN | 0 | R | 04-Feb | 11.3 | OUT | -1 | R | 15-Jul | 28.8 | IN | 0 |
| **ma** | 24-Nov | 20.9 | IN | -2 | W | 04-Feb | 11.3 | OUT | -1 | W | 15-Jul | 28.8 | IN | 0 |
| **as** | 24-Nov | 20.8 | IN | 0 | R | 06-Feb | 17.6 | IN | 0 | R | 15-Jul | 34.2 | OUT | 0 |
| **as** | 24-Nov | 21.2 | IN | 0 | W | 06-Feb | 17.6 | IN | 0 | W | 15-Jul | 34.2 | OUT | 0 |
| **ma** | 24-Nov | 20.5 | IN | 0 | R | 06-Feb | 15.8 | OUT | 0 | A | 15-Jul | 34.2 | OUT | 0 |
| **as** | 24-Nov | 21.4 | IN | 0 | A | 06-Feb | 15.8 | OUT | 0 | R | 16-Jul | 25.6 | IN | 0 |
| **ma** | 25-Nov | 18.8 | IN | 0 | M | 06-Feb | 15.8 | OUT | 0 | A | 11-Jul | 26.9 | IN | 0 |
| **as** | 26-Nov | 19.2 | IN | 0 | R | 07-Feb | 17.8 | IN | 0 | H | 11-Jul | 26.9 | IN | 0 |
| **ma** | 27-Nov | 18.8 | IN | 0 | W | 07-Feb | 17.8 | IN | 0 | Z | 11-Jul | 26.9 | IN | 0 |
| **bo** | 28-Nov | 18.9 | IN | 0 | R | 07-Feb | 17.4 | OUT | 0 | S | 11-Jul | 26.9 | IN | 0 |
| **as** | 29-Nov | 23.5 | IN | 0 | A | 07-Feb | 17.4 | OUT | 0 | WA2 | 11-Jul | 26.9 | IN | 0 |
| **ba** | 01-Dec | 20 | IN | 0 | R | 07-Feb | 18.1 | IN | 0 | R | 11-Jul | 26.9 | IN | 0 |
| **ma** | 01-Dec | 19.4 | IN | 0 | R | 10-Feb | 18.3 | IN | 0 | M | 11-Jul | 26.9 | IN | 0 |
| **ma** | 04-Dec | 18.8 | IN | 0 | R | 10-Feb | 14.9 | OUT | 0 | AN | 12-Jul | 32.6 | IN | 1 |
| **bs** | 04-Dec | 19.1 | IN | -1 | R | 11-Feb | 18.2 | IN | 0 | H | 12-Jul | 32.6 | IN | 1 |
| **ma** | 05-Dec | 17.6 | IN | -1 | W | 11-Feb | 18.2 | IN | 0 | Z | 12-Jul | 32.6 | IN | 1 |
| **ma** | 07-Dec | 17.7 | IN | -1 | R | 11-Feb | 13.8 | OUT | 0 | S | 12-Jul | 32.6 | IN | 1 |
| **ma** | 10-Dec | 17.9 | IN | -1 | W | 11-Feb | 13.8 | OUT | 0 | WA2 | 12-Jul | 32.6 | IN | 1 |
| **ma** | 11-Dec | 17.8 | IN | -1 | R | 12-Feb | 19.3 | IN | 0 | R | 12-Jul | 32.6 | IN | 1 |
| **as** | 12-Feb | 17.7 | IN | -1 | W | 12-Feb | 19.3 | IN | 0 | M | 12-Jul | 32.6 | IN | 1 |
| **ma** | 13-Dec | 18.1 | IN | -1 | R | 12-Feb | 18.1 | OUT | 0 | AN | 12-Jul | 32.6 | IN | 1 |
| **ja** | 16-Dec | 17.7 | OUT | 0 | W | 12-Feb | 18.1 | OUT | 0 | H | 13-Jul | 30.2 | IN | 0 |
| **bo** | 16-Dec | 17.9 | OUT | 0 | R | 14-Feb | 19 | IN | -1 | Z | 13-Jul | 30.2 | IN | 0 |
| **ma** | 16-Dec | 15.5 | OUT | 0 | W | 14-Feb | 19 | IN | -1 | S | 13-Jul | 30.2 | IN | 0 |
| **as** | 16-Dec | 18.1 | IN | 0 | A | 14-Feb | 19 | IN | -1 | WA2 | 13-Jul | 30.2 | IN | 0 |
| **ma** | 16-Dec | 18.1 | OUT | 0 | R | 14-Feb | 12.7 | OUT | -1 | R | 16-Jul | 25.4 | IN | 0 |
| **as** | 17-Dec | 20.7 | IN | 0 | W | 14-Feb | 12.7 | OUT | -1 | A | 16-Jul | 25.4 | IN | 0 |
| **bo** | 17-Dec | 20.7 | OUT | 0 | R | 15-Feb | 18.8 | IN | 0 | R | 16-Jul | 35.9 | OUT | 1 |
| **ja** | 17-Dec | 20.6 | OUT | -1 | W | 15-Feb | 18.8 | IN | 0 | W | 16-Jul | 35.9 | OUT | 1 |
| **ma** | 18-Dec | 20.7 | IN | -1 | R | 15-Feb | 15.3 | OUT | -1 | A | 16-Jul | 35.9 | OUT | 1 |
| **as** | 18-Dec | 20.6 | OUT | -1 | W | 15-Feb | 15.3 | OUT | -1 | R | 18-Jul | 25.1 | IN | 0 |
| **bo** | 18-Dec | 20.6 | OUT | -1 | R | 18-Feb | 19.8 | IN | 0 | W | 18-Jul | 25.1 | IN | 0 |
| **ma** | 20-Dec | 20.5 | OUT | -1 | W | 18-Feb | 19.8 | IN | 0 | R | 18-Jul | 34.8 | OUT | 1 |
| **ja** | 21-Dec | 20.4 | IN | 0 | R | 18-Feb | 16.4 | OUT | 0 | W | 18-Jul | 34.8 | OUT | 1 |
| **as** | 21-Dec | 20.4 | IN | 0 | W | 18-Feb | 16.4 | OUT | 0 | R | 20-Jul | 22.4 | IN | 0 |
| **ma** | 22-Dec | 20.3 | IN | 0 | R | 19-Feb | 18.2 | IN | -1 | W | 20-Jul | 22.4 | IN | 0 |
| **bo** | 23-Dec | 20.8 | IN | 0 | W | 19-Feb | 18.2 | IN | -1 | M | 20-Jul | 22.4 | IN | 0 |
| **ma** | 02-Jan | 18.7 | OUT | -2 | R | 19-Feb | 13.7 | OUT | -2 | R | 20-Jul | 36.2 | OUT | 2 |
| **ma** | 02-Jan | 19.3 | IN | -2 | W | 19-Feb | 13.7 | OUT | -2 | W | 20-Jul | 36.2 | OUT | 2 |
| **as** | 02-Jan | 19.7 | IN | 0 | R | 21-Feb | 17.8 | IN | 0 | R | 21-Jul | 24.4 | IN | 0 |
| **ma** | 02-Jan | 20.1 | IN | 0 | W | 21-Feb | 17.8 | IN | 0 | W | 21-Jul | 24.4 | IN | 0 |
| **bo** | 03-Jan | 16 | OUT | 0 | R | 21-Feb | 18.8 | OUT | -1 | R | 21-Jul | 31.3 | OUT | 1 |
| **bo** | 03-Jan | 20.4 | IN | 0 | W | 21-Feb | 18.8 | OUT | -1 | W | 21-Jul | 31.3 | OUT | 1 |
| **as** | 03-Jan | 17.5 | IN | 0 | R | 22-Feb | 18.6 | IN | 0 | M | 21-Jul | 31.3 | OUT | 1 |
| **ma** | 03-Jan | 17.2 | IN | 0 | W | 22-Feb | 18.6 | IN | 0 | AN | 17-Jul | 28.9 | IN | 0 |
| **ma** | 03-Jan | 20.8 | IN | 0 | R | 22-Feb | 17.2 | OUT | 0 | H | 17-Jul | 28.9 | IN | 0 |
| **ma** | 05-Jan | 20.9 | IN | 0 | A | 22-Feb | 17.2 | OUT | 0 | S | 17-Jul | 28.9 | IN | 0 |
| **bo** | 05-Jan | 19.9 | IN | 0 | R | 24-Feb | 19 | IN | 0 | Z | 17-Jul | 28.9 | IN | 0 |
| **ja** | 05-Jan | 19.3 | IN | 0 | W | 24-Feb | 19 | IN | 0 | AN | 18-Jul | 28.3 | IN | 0 |
| **dh** | 05-Jan | 18.1 | IN | -1 | R | 24-Feb | 16.3 | OUT | 0 | H | 18-Jul | 28.3 | IN | 0 |
| **ma** | 06-Jan | 19.4 | IN | 0 | W | 24-Feb | 16.3 | OUT | 0 | Z | 18-Jul | 28.3 | IN | 0 |
| **ma** | 13-Jan | 16.3 | OUT | -2 | R | 25-Feb | 19.4 | IN | 0 | S | 18-Jul | 28.3 | IN | 0 |
| **ma** | 13-Jan | 16.4 | OUT | -2 | W | 25-Feb | 19.4 | IN | 0 | AN | 19-Jul | 26.4 | IN | 0 |
| **as** | 13-Jan | 22.7 | IN | -1 | R | 25-Feb | 13.7 | OUT | -1 | H | 19-Jul | 26.4 | IN | 0 |
| **ma** | 13-Jan | 21.4 | IN | -1 | W | 25-Feb | 13.7 | OUT | -1 | Z | 19-Jul | 26.4 | IN | 0 |
| **ma** | 13-Jan | 22.8 | OUT | -1 | R | 26-Feb | 19 | IN | -1 | S | 19-Jul | 26.4 | IN | 0 |
| **as** | 14-Jan | 23.3 | IN | -2 | W | 26-Feb | 19 | IN | -1 | AN | 20-Jul | 37.1 | OUT | 1 |
| **ma** | 14-Jan | 28.1 | IN | -2 | R | 26-Feb | 16.6 | OUT | -1 | H | 20-Jul | 37.1 | OUT | 1 |
| **as** | 14-Jan | 1.5 | IN | -2 | W | 26-Feb | 16.6 | OUT | -1 | Z | 20-Jul | 37.1 | OUT | 1 |
| **as** | 14-Jan | 34.9 | IN | -1 | R | 28-Feb | 19 | IN | 0 | S | 21-Jul | 38.6 | OUT | 2 |
| **ma** | 15-Jan | 36.9 | IN | -1 | W | 28-Feb | 19 | IN | 0 | H | 21-Jul | 38.6 | OUT | 2 |
| **as** | 15-Jan | 38.2 | OUT | -1 | R | 28-Feb | 16.6 | OUT | 0 | Z | 21-Jul | 38.6 | OUT | 2 |
| **as** | 15-Jan | 39.4 | OUT | -1 | W | 28-Feb | 16.6 | OUT | 0 | S | 21-Jul | 38.6 | OUT | 2 |
| **as** | 15-Jan | 49.8 | OUT | -3 | R | 01-Mar | 19.6 | IN | 0 | R | 22-Jul | 25.4 | IN | 0 |
| **ma** | 16-Jan | 40.4 | OUT | -3 | W | 01-Mar | 19.6 | IN | 0 | W | 22-Jul | 25.4 | IN | 0 |
| **ma** | 16-Jan | 41.1 | OUT | -3 | A | 01-Mar | 19.6 | IN | 0 | R | 22-Jul | 33.9 | OUT | 1 |
| **ma** | 17-Jan | 41.2 | IN | -3 | R | 01-Mar | 16.7 | OUT | 0 | W | 22-Jul | 33.9 | OUT | 1 |
| **as** | 17-Jan | 41.2 | IN | -3 | W | 01-Mar | 16.7 | OUT | 0 | R | 25-Jul | 28.3 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **as** | 17-Jan | 41.2 | OUT | -1 | A | 01-Mar | 16.7 | OUT | 0 | W | 25-Jul | 28.3 | IN | 0 |
| **ma** | 17-Jan | 41.2 | OUT | -1 | R | 03-Mar | 21.8 | IN | 0 | R | 25-Jul | 35.9 | OUT | 2 |
| **ma** | 18-Jan | 42.2 | IN | 0 | W | 03-Mar | 21.8 | IN | 0 | W | 25-Jul | 35.9 | OUT | 2 |
| **as** | 18-Jan | 44.9 | IN | 0 | R | 03-Mar | 17 | OUT | 0 | R | 26-Jul | 25.6 | IN | 0 |
| **as** | 18-Jan | 48.9 | OUT | 0 | A | 03-Mar | 17 | OUT | 0 | W | 26-Jul | 25.6 | IN | 0 |
| **as** | 18-Jan | 48.9 | IN | 0 | R | 04-Mar | 21.3 | IN | 0 | M | 26-Jul | 25.6 | IN | 0 |
| **as** | 19-Jan | 49.9 | IN | 0 | R | 12-Feb | 22.3 | OUT | 0 | R | 26-Jul | 37.2 | OUT | 1 |
| **as** | 05-Mar | 23.6 | IN | 2 | R | 05-Mar | 21.9 | IN | 0 | W | 26-Jul | 37.2 | OUT | 1 |
| **as** | 05-Mar | 22.9 | IN | 2 | R | 07-Mar | 23.4 | IN | 0 | M | 26-Jul | 37.2 | OUT | 1 |
| **as** | 05-Mar | 23.4 | IN | 3 | R | 07-Mar | 20.8 | OUT | 0 | R | 27-Jul | 27.8 | IN | 0 |
| **as** | 07-Mar | 25.1 | IN | 2 | R | 08-Mar | 22.4 | IN | 0 | W | 27-Jul | 27.8 | IN | 0 |
| **as** | 09-Mar | 24.1 | IN | 3 | A | 08-Mar | 22.4 | IN | 0 | R | 27-Jul | 37.9 | OUT | 2 |
| **as** | 10-Mar | 23.2 | IN | 3 | M | 08-Mar | 22.4 | IN | 0 | W | 27-Jul | 37.9 | OUT | 2 |
| **as** | 12-Mar | 25.4 | IN | 2 | R | 08-Mar | 19 | OUT | 0 | A | 27-Jul | 37.9 | OUT | 2 |
| **as** | 12-Mar | 24.6 | IN | 2 | A | 08-Mar | 19 | OUT | 0 | R | 28-Jul | 26.8 | IN | 0 |
| **as** | 13- Mar | 23.5 | IN | 2 | M | 08-Mar | 19 | OUT | 0 | W | 28-Jul | 26.8 | IN | 0 |
| **as** | 22-May | 24.3 | IN | 2 | R | 09-Mar | 22.7 | IN | 0 | M | 28-Jul | 26.8 | IN | 0 |
| **ma** | 14-Mar | 23.1 | IN | 2 | W | 09-Mar | 22.7 | IN | 0 | R | 28-Jul | 30.9 | OUT | 0 |
| **ma** | 14-Mar | 24.2 | IN | 2 | R | 10-Mar | 17.7 | OUT | 0 | W | 28-Jul | 30.9 | OUT | 0 |
| **ja** | 15-Mar | 23.9 | IN | 2 | W | 10-Mar | 17.7 | OUT | 0 | R | 30-Jul | 25.8 | IN | 0 |
| **bo** | 15-Mar | 23.3 | IN | 2 | R | 12-Mar | 22.1 | IN | 0 | M | 30-Jul | 25.8 | IN | 0 |
| **bo** | 15-Mar | 24.1 | IN | 2 | R | 12-Mar | 16.8 | OUT | 0 | R | 30-Jul | 36.6 | OUT | 2 |
| **la** | 15-Mar | 22.9 | IN | 2 | R | 14-Mar | 21.1 | IN | 0 | M | 30-Jul | 36.6 | OUT | 2 |
| **la** | 15-Mar | 23.2 | IN | 2 | R | 14-Mar | 21.2 | OUT | 0 | R | 31-Jul | 24 | IN | 0 |
| **la** | 15-Mar | 21.9 | IN | 2 | R | 15-Mar | 22.7 | IN | 0 | W | 31-Jul | 24 | IN | 0 |
| **ma** | 16-Mar | 23.8 | IN | 2 | A | 15-Mar | 22.7 | IN | 0 | R | 31-Jul | 32.3 | OUT | 1 |
| **EK** | 07-Jun | 24 | IN | -2 | R | 15-Mar | 20.2 | OUT | 0 | W | 31-Jul | 32.3 | OUT | 1 |
| **SA** | 07-Jun | 24 | IN | 0 | A | 15-Mar | 20.2 | OUT | 0 | R | 02-Aug | 29.1 | IN | 0 |
| **ZA** | 07-Jun | 24 | IN | -1 | R | 17-Mar | 22.8 | IN | 0 | W | 02-Aug | 29.1 | IN | 0 |
| **AM** | 07-Jun | 24 | IN | 0 | W | 17-Mar | 22.8 | IN | 0 | R | 02-Aug | 33.2 | OUT | 2 |
| **GA** | 07-Jun | 24 | IN | -2 | R | 17-Mar | 18.4 | OUT | 0 | W | 02-Aug | 33.2 | OUT | 2 |
| **SA** | 08-Jun | 23.9 | IN | 1 | W | 17-Mar | 18.4 | OUT | 0 | R | 03-Aug | 28.6 | IN | 0 |
| **LA** | 08-Jun | 23.9 | IN | 0 | R | 18-Mar | 21.7 | IN | 0 | W | 03-Aug | 28.6 | IN | 0 |
| **GA** | 08-Jun | 23.9 | IN | -1 | W | 18-Mar | 21.7 | IN | 0 | A | 01-Aug | 38.6 | OUT | 2 |
| **AM** | 08-Jun | 23.9 | IN | 0 | R | 19-Mar | 22.5 | IN | 0 | H | 01-Aug | 38.6 | OUT | 2 |
| **EK** | 08-Jun | 23.9 | IN | 0 | R | 19-Mar | 22.5 | OUT | 0 | Z | 01-Aug | 38.6 | OUT | 2 |
| **SA** | 15-Jun | 22.9 | IN | 0 | R | 20-Mar | 23.5 | IN | 0 | S | 01-Aug | 38.6 | OUT | 2 |
| **ZA** | 15-Jun | 22.9 | IN | -1 | R | 20-Mar | 20.4 | OUT | 0 | A | 05-Aug | 28.5 | IN | 0 |
| **EK** | 15-Jun | 22.9 | IN | -1 | W | 20-Mar | 20.4 | OUT | 0 | H | 05-Aug | 28.5 | IN | 0 |
| **AM** | 15-Jun | 22.9 | IN | -1 | R | 24-Mar | 24.5 | IN | 0 | Z | 05-Aug | 28.5 | IN | 0 |
| **GA** | 15-Jun | 22.9 | IN | 0 | W | 24-Mar | 24.5 | IN | 0 | S | 05-Aug | 28.5 | IN | 0 |
| **EK** | 28-Jun | 31.9 | IN | 1 | A | 24-Mar | 24.5 | IN | 0 | A | 07-Aug | 39.1 | OUT | 2 |
| **ZA** | 28-Jun | 31.9 | IN | 2 | M | 24-Mar | 24.5 | IN | 0 | H | 07-Aug | 39.1 | OUT | 2 |
| **GA** | 28-Jun | 31.9 | IN | 1 | R | 24-Mar | 22.2 | OUT | 0 | Z | 07-Aug | 39.1 | OUT | 2 |
| **AM** | 28-Jun | 31.9 | IN | 2 | W | 24-Mar | 22.2 | OUT | 0 | S | 07-Aug | 39.1 | OUT | 2 |
| **EK** | 22-Jun | 25.5 | IN | 0 | M | 24-Mar | 22.2 | OUT | 0 | A | 08-Aug | 33.7 | IN | 1 |
| **AM** | 22-Jun | 25.5 | IN | -1 | A | 24-Mar | 22.2 | OUT | 0 | H | 08-Aug | 33.7 | IN | 1 |
| **ZA** | 22-Jun | 25.5 | IN | 0 | R | 25-Mar | 21.6 | IN | 0 | Z | 08-Aug | 33.7 | IN | 1 |
| **LA** | 22-Jun | 25.5 | IN | 0 | R | 25-Mar | 22.6 | OUT | 0 | S | 08-Aug | 33.7 | IN | 1 |
| **A,** | 01-Jul | 36.4 | OUT | 3 | R | 26-Mar | 24.1 | IN | 0 | H | 10-Aug | 38.1 | OUT | 3 |
| **ZA** | 01-Jul | 36.4 | OUT | 3 | W | 26-Mar | 24.1 | IN | 0 | Z | 10-Aug | 38.1 | OUT | 3 |
| **EK** | 01-Jul | 36.4 | OUT | 2 | M | 26-Mar | 24.1 | IN | 0 | S | 10-Aug | 38.1 | OUT | 3 |
| **AS** | 03-Jul | 23.7 | IN | 3 | A | 26-Mar | 24.1 | IN | 0 | R | 03-Aug | 34.1 | OUT | 2 |
| **EK** | 03-Jul | 23.7 | IN | 2 | R | 26-Mar | 23.5 | OUT | 0 | W | 03-Aug | 34.1 | OUT | 2 |
| **ZA** | 03-Jul | 23.7 | IN | 3 | M | 26-Mar | 23.5 | OUT | 0 | A | 03-Aug | 34.1 | OUT | 2 |
| **SA** | 03-Jul | 23.7 | IN | 0 | R | 28-Mar | 25.2 | IN | 0 | R | 04-Aug | 28.5 | IN | -1 |
| **EK** | 05-Jul | 28 | OUT | 2 | R | 28-Mar | 26.7 | OUT | 0 | W | 04-Aug | 28.5 | IN | -1 |
| **LA** | 05-Jul | 28 | OUT | 3 | W | 28-Mar | 26.7 | OUT | 0 | R | 04-Aug | 37.4 | OUT | 2 |
| **SH** | 05-Jul | 28 | OUT | 2 | R | 29-Mar | 25.8 | IN | 0 | W | 04-Aug | 37.4 | OUT | 2 |
| **AS** | 05-Jul | 28 | OUT | 1 | W | 29-Mar | 25.8 | IN | 0 | R | 09-Aug | 24.3 | IN | 0 |
| **ZA** | 07-Jul | 27.3 | IN | 0 | R | 29-Mar | 27.1 | OUT | 0 | W | 09-Aug | 24.3 | IN | 0 |
| **EK** | 07-Jul | 27.3 | IN | -1 | W | 29-Mar | 27.1 | OUT | 0 | M | 09-Aug | 24.3 | IN | 0 |
| **AM** | 07-Jul | 27.3 | IN | -3 | R | 01-Apr | 24.7 | IN | 0 | R | 09-Aug | 29.6 | OUT | 2 |
| **SA** | 07-Jul | 27.3 | IN | 0 | W | 01-Apr | 24.7 | IN | 0 | W | 09-Aug | 29.6 | OUT | 2 |
| **EK** | 08-Jul | 27.5 | IN | -1 | R | 01-Apr | 19 | OUT | 0 | M | 09-Aug | 29.6 | OUT | 2 |
| **GA** | 08-Jul | 27.5 | IN | -2 | W | 01-Apr | 19 | OUT | 0 | R | 12-Aug | 28.4 | IN | 0 |
| **AH** | 08-Jul | 27.5 | IN | -3 | R | 02-Apr | 2.9 | IN | 0 | A | 12-Aug | 28.4 | IN | 0 |
| **AS** | 08-Jul | 27.5 | IN | 0 | R | 02-Apr | 21.3 | OUT | 0 | M | 12-Aug | 28.4 | IN | 0 |
| **ZA** | 08-Jul | 27.5 | IN | -1 | R | 04-Apr | 26.2 | IN | 0 | R | 12-Aug | 40.3 | OUT | 2 |
| **SA** | 08-Jul | 27.5 | IN | 0 | R | 04-Apr | 24.7 | OUT | 0 | M | 12-Aug | 40.3 | OUT | 2 |
| **AM** | 13-Jul | 27.7 | IN | -1 | R | 05-Apr | 25.3 | IN | 0 | A | 12-Aug | 40.3 | OUT | 2 |
| **EK** | 13-Jul | 27.7 | IN | 0 | A | 05-Apr | 25.3 | IN | 0 | R | 13-Aug | 25.8 | IN | 0 |
| **GA** | 13-Jul | 27.7 | IN | 0 | W | 05-Apr | 25.3 | IN | 0 | A | 13-Aug | 25.8 | IN | 0 |
| **AS** | 13-Jul | 27.7 | IN | 0 | R | 05-Apr | 23.1 | OUT | 0 | R | 13-Aug | 36.7 | OUT | 3 |
| **SA** | 13-Jul | 27.7 | IN | -1 | A | 05-Apr | 23.1 | OUT | 0 | W | 13-Aug | 36.7 | OUT | 3 |
| **SA** | 24-Jul | 30.8 | IN | 0 | R | 08-Apr | 25.4 | IN | 0 | A | 13-Aug | 36.7 | OUT | 3 |
| **EK** | 24-Jul | 30.8 | IN | 0 | W | 08-Apr | 25.4 | IN | 0 | R | 14-Aug | 26.6 | IN | 0 |
| **GA** | 24-Jul | 30.8 | IN | 1 | R | 09-Apr | 26.4 | IN | 0 | W | 14-Aug | 26.6 | IN | 0 |
| **ZA** | 24-Jul | 30.8 | IN | 0 | W | 09-Apr | 26.4 | IN | 0 | A | 14-Aug | 26.6 | IN | 0 |
| **AM** | 24-Jul | 30.8 | IN | 2 | A | 09-Apr | 26.4 | IN | 0 | R | 14-Aug | 37.4 | OUT | 2 |
| **AS** | 24-Jul | 30.8 | IN | 0 | M | 09-Apr | 26.4 | IN | 0 | W | 14-Aug | 37.4 | OUT | 2 |
| **LA** | 24-Jul | 30.8 | IN | 2 | R | 09-Apr | 27.2 | OUT | 0 | A | 14-Aug | 37.4 | OUT | 2 |
| **SA** | 24-Jul | 30.8 | IN | 0 | M | 09-Apr | 27.2 | OUT | 0 | R | 18-Aug | 25 | IN | -1 |
| **ZA** | 29-Jul | 23.8 | IN | 0 | W | 09-Apr | 27.2 | OUT | 0 | A | 18-Aug | 25 | IN | -1 |
| **SA** | 29-Jul | 23.8 | IN | 0 | A | 09-Apr | 27.2 | OUT | 0 | R | 15-Aug | 35.6 | OUT | 2 |
| **EK** | 29-Jul | 23.8 | IN | 1 | R | 12-Apr | 27 | IN | 0 | A | 15-Aug | 35.6 | OUT | 2 |
| **AM** | 29-Jul | 23.8 | IN | 2 | W | 12-Apr | 27 | IN | 0 | R | 17-Aug | 26.7 | IN | 0 |
| **AS** | 29-Jul | 23.8 | IN | 0 | M | 12-Apr | 27 | IN | 0 | A | 17-Aug | 26.7 | IN | 0 |
| **OM** | 01-Aug | 28.3 | IN | 0 | A | 12-Apr | 27 | IN | 0 | R | 17-Aug | 40.7 | OUT | 3 |
| **DR** | 01-Aug | 28.3 | IN | 0 | R | 12-Apr | 22.7 | OUT | 0 | A | 17-Aug | 40.7 | OUT | 3 |
| **AN** | 01-Aug | 28.3 | IN | 2 | A | 12-Apr | 22.7 | OUT | 0 | R | 01-Sep | 32.4 | OUT | 1 |
| **SA** | 01-Aug | 28.3 | IN | 2 | W | 12-Apr | 22.7 | OUT | 0 | W | 01-Sep | 32.4 | OUT | 1 |
| **ZA** | 01-Aug | 28.3 | IN | 0 | M | 12-Apr | 22.7 | OUT | 0 | M | 01-Sep | 32.4 | OUT | 1 |
| **EK** | 23-Aug | 22.2 | IN | 1 | R | 15-Apr | 25.3 | IN | 0 | R | 02-Sep | 28.2 | IN | 0 |
| **SH** | 23-Aug | 22.2 | IN | 2 | W | 15-Apr | 25.3 | IN | 0 | A | 02-Sep | 28.2 | IN | 0 |
| **MU** | 23-Aug | 22.2 | IN | 3 | A | 15-Apr | 25.3 | IN | 0 | M | 02-Sep | 28.2 | IN | 0 |
| **EA** | 23-Aug | 22.2 | IN | 0 | R | 15-Apr | 23.9 | OUT | 0 | R | 02-Sep | 26.6 | OUT | 2 |
| **ZA** | 23-Aug | 22.2 | IN | 1 | A | 15-Apr | 23.9 | OUT | 0 | M | 02-Sep | 26.6 | OUT | 2 |
| **AM** | 23-Aug | 22.2 | IN | 2 | W | 15-Apr | 23.9 | OUT | 0 | A | 02-Sep | 26.6 | OUT | 2 |
| **AS** | 23-Aug | 22.2 | IN | 3 | R | 16-Apr | 25.3 | IN | 0 | R | 03-Sep | 28.6 | IN | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SA** | 23-Aug | 22.2 | IN | 0 | W | 16-Apr | 25.3 | IN | 0 | A | 03-Sep | 28.6 | IN | 1 |
| **OM** | 23-Aug | 22.2 | IN | 0 | A | 16-Apr | 25.3 | IN | 0 | R | 03-Sep | 35.9 | OUT | 3 |
| **SA** | 25-Aug | 28.7 | IN | 0 | R | 16-Apr | 20.8 | OUT | 0 | A | 03-Sep | 35.9 | OUT | 3 |
| **ZA** | 25-Aug | 28.7 | IN | 1 | A | 16-Apr | 20.8 | OUT | 0 | R | 04-Sep | 27.7 | IN | 0 |
| **AB** | 25-Aug | 28.7 | IN | 0 | W | 16-Apr | 20.8 | OUT | 0 | A | 04-Sep | 27.7 | IN | 0 |
| **HA** | 25-Aug | 28.7 | IN | 0 | R | 18-Apr | 24.1 | IN | 0 | R | 04-Sep | 34.3 | OUT | 2 |
| **EK** | 25-Aug | 28.7 | IN | 2 | W | 18-Apr | 24.1 | IN | 0 | A | 04-Sep | 34.3 | OUT | 2 |
| **AM** | 25-Aug | 28.7 | IN | 1 | A | 18-Apr | 24.1 | IN | 0 | R | 05-Sep | 24 | IN | 0 |
| **SH** | 25-Aug | 28.7 | IN | 2 | R | 18-Apr | 21.7 | OUT | 0 | W | 05-Sep | 24 | IN | 0 |
| **MU** | 25-Aug | 28.7 | IN | 0 | W | 18-Apr | 21.7 | OUT | 0 | R | 01-Sep | 32.4 | OUT | 1 |
| **SA** | 29-Aug | 25.6 | IN | -1 | R | 21-Apr | 27.2 | IN | 0 | W | 01-Sep | 32.4 | OUT | 1 |
| **ZA** | 29-Aug | 25.6 | IN | -2 | W | 21-Apr | 27.2 | IN | 0 | M | 01-Sep | 32.4 | OUT | 1 |
| **OM** | 29-Aug | 25.6 | IN | -1 | A | 21-Apr | 27.2 | IN | 0 | R | 02-Sep | 28.2 | IN | 0 |
| **EK** | 29-Aug | 25.6 | IN | -2 | R | 21-Apr | 25.8 | OUT | 0 | A | 02-Sep | 28.2 | IN | 0 |
| **GA** | 29-Aug | 25.6 | IN | -1 | W | 21-Apr | 25.8 | OUT | 0 | M | 02-Sep | 28.2 | IN | 0 |
| **AM** | 29-Aug | 25.6 | IN | -1 | R | 22-Apr | 26.4 | IN | 1 | R | 02-Sep | 36.6 | OUT | 2 |
| **LA** | 29-Aug | 25.6 | IN | -1 | A | 22-Apr | 26.4 | IN | 1 | M | 02-Sep | 36.6 | OUT | 2 |
| **SA** | 29-Aug | 25.6 | IN | -2 | W | 22-Apr | 26.4 | IN | 1 | A | 02-Sep | 36.6 | OUT | 2 |
| **AS** | 04-Sep | 38.7 | OUT | 2 | R | 22-Apr | 24.8 | OUT | 0 | R | 03-Sep | 28.6 | IN | 1 |
| **EK** | 04-Sep | 38.7 | OUT | 2 | W | 22-Apr | 24.8 | OUT | 0 | A | 03-Sep | 28.6 | IN | 1 |
| **ZA** | 04-Sep | 38.7 | OUT | 3 | R | 23-Apr | 24.2 | IN | 0 | R | 03-Sep | 35.9 | OUT | 3 |
| **EM** | 05-Sep | 34 | IN | 0 | W | 23-Apr | 24.2 | IN | 0 | A | 03-Sep | 35.9 | OUT | 3 |
| **ZA** | 05-Sep | 34 | IN | 1 | A | 23-Apr | 24.2 | IN | 0 | R | 04-Sep | 27.7 | IN | 0 |
| **OM** | 05-Sep | 34 | IN | 0 | R | 23-Apr | 17.9 | OUT | 0 | A | 04-Sep | 27.7 | IN | 0 |
| **GA** | 05-Sep | 34 | IN | 1 | W | 23-Apr | 17.9 | OUT | 0 | R | 04-Sep | 34.3 | OUT | 2 |
| **AM** | 05-Sep | 34 | IN | 0 | R | 24-Apr | 24.6 | IN | 0 | A | 04-Sep | 34.3 | OUT | 2 |
| **AS** | 05-Sep | 34 | IN | 0 | W | 24-Apr | 24.6 | IN | 0 | R | 05-Sep | 24 | IN | 0 |
| **ZA** | 15-Jan | 25.7 | OUT | -2 | R | 24-Apr | 21.3 | OUT | 0 | W | 05-Sep | 24 | IN | 0 |
| **KA** | 15-Jan | 25.7 | OUT | -1 | W | 24-Apr | 21.3 | OUT | 0 | R | 18-Sep | 28.6 | IN | 0 |
| **FA** | 15-Jan | 25.7 | OUT | 0 | R | 25-Apr | 25.3 | IN | 0 | W | 18-Sep | 28.6 | IN | 0 |
| **SH** | 15-Jan | 25.7 | OUT | -1 | M | 25-Apr | 25.3 | IN | 0 | R | 18-Sep | 32.7 | OUT | 1 |
| **AM** | 15-Jan | 25.7 | OUT | -2 | A | 25-Apr | 25.3 | IN | 0 | W | 18-Sep | 32.7 | OUT | 1 |
| **AS** | 15-Jan | 25.7 | OUT | -1 | R | 25-Apr | 23.1 | OUT | 0 | R | 22-Sep | 25.2 | IN | 0 |
| **AM** | 21-Oct | 24.7 | IN | 0 | A | 25-Apr | 23.1 | OUT | 0 | W | 22-Sep | 25.2 | IN | 0 |
| **AS** | 21-Oct | 24.7 | IN | -2 | R | 26-Apr | 26.9 | IN | 0 | M | 22-Sep | 25.2 | IN | 0 |
| **HIN** | 21-Oct | 24.7 | IN | -1 | W | 26-Apr | 26.9 | IN | 0 | R | 22-Sep | 21.6 | OUT | 1 |
| **SH** | 21-Oct | 24.7 | IN | 0 | R | 26-Apr | 27.5 | OUT | 0 | W | 22-Sep | 21.6 | OUT | 1 |
| **RO** | 21-Oct | 24.7 | IN | -2 | W | 26-Apr | 27.5 | OUT | 0 | M | 22-Sep | 21.6 | OUT | 1 |
| **OM** | 21-Oct | 24.7 | IN | -1 | R | 28-Apr | 24.2 | IN | 0 | R | 27-Sep | 24.4 | IN | 0 |
| **SA** | 21-Oct | 24.7 | IN | -1 | W | 28-Apr | 24.2 | IN | 0 | W | 27-Sep | 24.4 | IN | 0 |
| **SA** | 23-Oct | 23.3 | OUT | 0 | R | 28-Apr | 21.6 | OUT | 0 | R | 27-Sep | 30.4 | OUT | 1 |
| **AM** | 23-Oct | 23.3 | OUT | -1 | W | 28-Apr | 21.6 | OUT | 0 | W | 27-Sep | 30.4 | OUT | 1 |
| **ZA** | 23-Oct | 23.3 | OUT | -2 | R | 29-Apr | 24.4 | IN | 0 | R | 29-Sep | 25.4 | IN | 0 |
| **GA** | 23-Oct | 23.3 | OUT | -1 | W | 29-Apr | 24.4 | IN | 0 | W | 29-Sep | 25.4 | IN | 0 |
| **GH** | 23-Oct | 23.3 | OUT | 0 | R | 29-Apr | 22.2 | OUT | 0 | A | 29-Sep | 25.4 | IN | 0 |
| **OM** | 23-Oct | 23.3 | OUT | -1 | W | 29-Apr | 22.2 | OUT | 0 | R | 29-Sep | 28 | OUT | 1 |
| **AS** | 23-Oct | 23.3 | OUT | 0 | R | 30-Apr | 24.6 | IN | 0 | W | 29-Sep | 28 | OUT | 1 |
| **SA** | 23-Oct | 23.3 | OUT | -1 | W | 30-Apr | 24.6 | IN | 0 | R | 05-Oct | 26.5 | OUT | 1 |
| **AM** | 24-Oct | 16.3 | IN | 0 | R | 30-Apr | 21.6 | OUT | 0 | W | 05-Oct | 26.5 | OUT | 1 |
| **SA** | 24-Oct | 16.3 | IN | 1 | W | 30-Apr | 21.6 | OUT | 0 | R | 6-100 | 24.4 | IN | -1 |
| **EA** | 24-Oct | 16.3 | IN | 0 | R | 01-May | 26.3 | IN | 0 | W | 6-100 | 24.4 | IN | -1 |
| **KA** | 24-Oct | 16.3 | IN | -1 | W | 01-May | 26.3 | IN | 0 | R | 06-Oct | 30.4 | OUT | 0 |
| **OM** | 24-Oct | 16.3 | IN | 0 | A | 01-May | 26.3 | IN | 0 | W | 06-Oct | 30.4 | OUT | 0 |
| **SA** | 24-Oct | 16.3 | IN | 0 | R | 01-May | 25.9 | OUT | 0 | R | 10-Oct | 21.9 | IN | -1 |
| **AS** | 24-Oct | 16.3 | IN | 0 | W | 01-May | 25.9 | OUT | 0 | W | 10-Oct | 21.9 | IN | -1 |
| **SA** | 05-Nov | 24.2 | IN | 0 | R | 02-May | 26.7 | IN | 0 | R | 10-Oct | 34.8 | OUT | 1 |
| **SA** | 05-Nov | 24.2 | IN | 0 | W | 02-May | 26.7 | IN | 0 | W | 10-Oct | 34.8 | OUT | 1 |
| **LA** | 05-Nov | 24.2 | IN | -1 | R | 02-May | 26.3 | OUT | 0 | R | 11-Oct | 25.4 | IN | -1 |
| **AM** | 05-Nov | 24.2 | IN | -1 | W | 02-May | 26.3 | OUT | 0 | W | 11-Oct | 25.4 | IN | -1 |
| **AM** | 09-Nov | 21.2 | IN | 0 | R | 03-May | 27.2 | IN | 0 | R | 11-Oct | 28.4 | OUT | 0 |
| **SA** | 09-Nov | 21.2 | IN | -1 | W | 03-May | 27.2 | IN | 0 | W | 11-Oct | 28.4 | OUT | 0 |
| **HIN** | 09-Nov | 21.2 | IN | 0 | R | 03-May | 25.3 | OUT | 0 | R | 15-Oct | 25.1 | IN | 0 |
| **SH** | 09-Nov | 21.2 | IN | -2 | W | 03-May | 25.3 | OUT | 0 | W | 15-Oct | 25.1 | IN | 0 |
| **AB** | 09-Nov | 21.2 | IN | 0 | R | 04-May | 26.7 | IN | 0 | M | 15-Oct | 25.1 | IN | 0 |
| **ZA** | 09-Nov | 21.2 | IN | 0 | W | 04-May | 26.7 | IN | 0 | R | 15-Oct | 29.4 | OUT | 1 |
| **GA** | 09-Nov | 21.2 | IN | 1 | R | 04-May | 31.3 | OUT | 0 | W | 15-Oct | 29.4 | OUT | 1 |
| **OM** | 09-Nov | 21.2 | IN | 0 | W | 04-May | 31.3 | OUT | 0 | R | 17-Oct | 26.7 | IN | 0 |
| **KA** | 09-Nov | 21.2 | IN | 1 | R | 05-May | 27.6 | IN | 0 | W | 17-Oct | 26.7 | IN | 0 |
| **AS** | 26-Nov | 18.5 | OUT | -1 | W | 05-May | 27.6 | IN | 0 | R | 17-Oct | 26.4 | OUT | 1 |
| **KA** | 26-Nov | 18.5 | OUT | -2 | M | 05-May | 27.6 | IN | 0 | W | 17-Oct | 26.4 | OUT | 1 |
| **OM** | 26-Nov | 18.5 | OUT | -2 | R | 05-May | 27.6 | OUT | 0 | R | 22-Oct | 26.3 | IN | 0 |
| **SA** | 26-Nov | 18.5 | OUT | -1 | W | 05-May | 27.6 | OUT | 0 | W | 22-Oct | 26.3 | IN | 0 |
| **GA** | 26-Nov | 18.5 | OUT | 0 | R | 14-May | 26.2 | IN | 0 | R | 22-Oct | 20.7 | OUT | 0 |
| **AM** | 26-Nov | 18.5 | OUT | -2 | W | 14-May | 26.2 | IN | 0 | W | 22-Oct | 20.7 | OUT | 0 |
| **HIN** | 26-Nov | 18.5 | OUT | -1 | R | 14-May | 24.6 | OUT | 0 | R | 24-Oct | 26.7 | IN | 0 |
| **SH** | 26-Nov | 18.5 | OUT | 0 | W | 14-May | 24.6 | OUT | 0 | W | 24-Oct | 26.7 | IN | 0 |
| **ZA** | 26-Nov | 18.5 | OUT | -2 | R | 15-May | 27.1 | IN | 0 | R | 24-Oct | 23.4 | OUT | 0 |
| **RO** | 26-Nov | 18.5 | OUT | 0 | W | 15-May | 27.1 | IN | 0 | W | 24-Oct | 23.4 | OUT | 0 |
| **R** | 16-Oct | 28 | IN | 0 | R | 15-May | 26.1 | OUT | 0 | R | 25-Oct | 25.6 | IN | 0 |
| **W** | 16-Oct | 29 | IN | 0 | W | 15-May | 26.1 | OUT | 0 | W | 25-Oct | 25.6 | IN | 0 |
| **R** | 16-Oct | 29 | IN | 0 | R | 16-May | 26.8 | IN | 0 | R | 25-Oct | 36.1 | OUT | 1 |
| **A** | 17-Oct | 27.8 | IN | 0 | W | 16-May | 26.8 | IN | 0 | W | 25-Oct | 36.1 | OUT | 1 |
| **M** | 17-Oct | 28.5 | IN | 0 | A | 16-May | 26.8 | IN | 0 | R | 03-Nov | 24.4 | IN | 0 |
| **R** | 18-Oct | 27 | IN | 0 | R | 16-May | 25.4 | OUT | 0 | W | 03-Nov | 24.4 | IN | 0 |
| **W** | 18-Oct | 24.4 | IN | 0 | W | 16-May | 25.4 | OUT | 0 | M | 03-Nov | 24.4 | IN | 0 |
| **R** | 19-Oct | 27.3 | IN | 0 | R | 18-May | 28.2 | IN | 0 | R | 03-Nov | 20.7 | OUT | 0 |
| **M** | 20-Oct | 27.4 | IN | 0 | W | 18-May | 28.2 | IN | 0 | W | 03-Nov | 20.7 | OUT | 0 |
| **W** | 22-Oct | 26 | IN | 0 | M | 18-May | 28.2 | IN | 0 | R | 06-Nov | 22.5 | IN | 0 |
| **R** | 22-Oct | 27 | IN | 0 | A | 18-May | 28.2 | IN | 0 | W | 06-Nov | 22.5 | IN | 0 |
| **M** | 23-Oct | 26 | IN | 0 | R | 15-May | 32.7 | OUT | 0 | M | 06-Nov | 22.5 | IN | 0 |
| **S** | 24-Oct | 26.5 | IN | 0 | W | 15-May | 32.7 | OUT | 0 | R | 06-Nov | 16.7 | OUT | -1 |
| **A** | 24-Oct | 26.8 | IN | 0 | R | 19-May | 28.7 | IN | 0 | W | 06-Nov | 16.7 | OUT | -1 |
| **R** | 25-Oct | 27.3 | IN | 0 | W | 19-May | 28.7 | IN | 0 | M | 06-Nov | 16.7 | OUT | -1 |
| **W** | 25-Oct | 27.6 | IN | 0 | R | 16-May | 32.5 | OUT | 1 | R | 08-Nov | 21.9 | IN | 0 |
| **M** | 26-Oct | 27.4 | IN | 0 | W | 16-May | 32.5 | OUT | 1 | W | 08-Nov | 21.9 | IN | 0 |
| **R** | 27-Oct | 28 | IN | 0 | R | 20-May | 27.3 | IN | 0 | R | 08-Nov | 19 | OUT | 0 |
| **R** | 28-Oct | 26 | IN | 0 | W | 20-May | 27.3 | IN | 0 | W | 08-Nov | 19 | OUT | 0 |
| **M** | 08-Nov | 25.6 | IN | 0 | R | 20-May | 28.3 | OUT | 0 | R | 08-Nov | 21.8 | IN | 0 |
| **A** | 08-Nov | 25.6 | IN | 0 | W | 20-May | 28.3 | OUT | 0 | W | 08-Nov | 21.8 | IN | 0 |
| **R** | 08-Nov | 27 | IN | 0 | R | 21-May | 26.2 | IN | 0 | R | 08-Nov | 19.9 | OUT | -1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **W** | 08-Nov | 27 | IN | 0 | W | 21-May | 26.2 | IN | 0 | W | 08-Nov | 19.9 | OUT | -1 |
| **A** | 08-Nov | 27 | IN | 0 | M | 21-May | 26.2 | IN | 0 | M | 08-Nov | 19.9 | OUT | -1 |
| **R** | 09-Nov | 25.4 | IN | 0 | A | 21-May | 26.2 | IN | 0 | R | 13-Nov | 21.2 | IN | 0 |
| **R** | 11-Nov | 25 | IN | 0 | R | 21-May | 31.5 | OUT | 0 | W | 13-Nov | 21.2 | IN | 0 |
| **W** | 11-Nov | 25 | IN | 0 | W | 21-May | 31.5 | OUT | 0 | R | 13-Nov | 16 | OUT | -1 |
| **R** | 12-Nov | 24 | IN | 0 | R | 22-May | 24.6 | IN | 0 | W | 13-Nov | 16 | OUT | -1 |
| **W** | 12-Nov | 24 | IN | 0 | W | 22-May | 24.6 | IN | 0 | R | 14-Nov | 21.2 | IN | 0 |
| **R** | 13-Nov | 22 | IN | 0 | A | 22-May | 24.6 | IN | 0 | W | 14-Nov | 21.2 | IN | 0 |
| **R** | 14-Nov | 21.7 | IN | 0 | R | 22-May | 32.8 | OUT | 1 | M | 14-Nov | 21.2 | IN | 0 |
| **W** | 14-Nov | 21.7 | IN | 0 | W | 22-May | 32.8 | OUT | 1 | R | 14-Nov | 16.5 | OUT | 0 |
| **R** | 14-Nov | 19.5 | IN | 0 | R | 23-May | 28.2 | IN | 0 | W | 14-Nov | 16.5 | OUT | 0 |
| **R** | 16-Nov | 22.3 | IN | 0 | W | 23-May | 28.2 | IN | 0 | R | 15-Nov | 21.8 | IN | 0 |
| **W** | 16-Nov | 22.3 | IN | 0 | M | 23-May | 28.2 | IN | 0 | W | 15-Nov | 21.8 | IN | 0 |
| **R** | 17-Nov | 23 | IN | 0 | R | 23-May | 30.9 | OUT | 1 | R | 15-Nov | 17.5 | OUT | 0 |
| **W** | 17-Nov | 23 | IN | 0 | W | 23-May | 30.9 | OUT | 1 | W | 15-Nov | 17.5 | OUT | 0 |
| **R** | 17-Nov | 17.2 | IN | 0 | R | 24-May | 24.7 | IN | 0 | R | 19-Nov | 20.2 | IN | -1 |
| **S** | 26-Nov | 18.4 | IN | -1 | W | 24-May | 24.7 | IN | 0 | W | 19-Nov | 20.2 | IN | -1 |
| **AN** | 26-Nov | 18.4 | IN | -1 | R | 24-May | 31.6 | OUT | 1 | M | 19-Nov | 20.2 | IN | -1 |
| **S** | 26-Nov | 18.2 | IN | -2 | W | 24-May | 31.6 | OUT | 1 | R | 19-Nov | 15.3 | OUT | -1 |
| **AN** | 26-Nov | 18.2 | IN | -2 | A | 24-May | 31.6 | OUT | 1 | W | 19-Nov | 15.3 | OUT | -1 |
| **S** | 27-Nov | 17.2 | IN | -2 | R | 26-May | 25.9 | IN | 0 | M | 19-Nov | 15.3 | OUT | -1 |
| **AN** | 27-Nov | 17.2 | IN | -2 | A | 26-May | 25.9 | IN | 0 | R | 21-Nov | 20.3 | IN | 0 |
| **S** | 28-Nov | 18.1 | IN | 1 | W | 26-May | 25.9 | IN | 0 | W | 21-Nov | 20.3 | IN | 0 |
| **R** | 30-Nov | 17.6 | IN | 1 | R | 26-May | 27.5 | OUT | 1 | S | 04-May | 23.3 | IN | 0 |
| **W** | 30-Nov | 17.6 | IN | 1 | W | 26-May | 27.5 | OUT | 1 | AN | 01-May | 23.3 | IN | 0 |
| **R** | 02-Dec | 19.7 | IN | 1 | R | 26-May | 25.8 | IN | 0 | H | 04-Apr | 23.3 | IN | 0 |
| **W** | 02-Dec | 19.7 | IN | 1 | W | 26-May | 25.8 | IN | 0 | Z | 04-May | 23.3 | IN | 0 |
| **R** | 02-Dec | 15 | IN | 0 | R | 26-May | 36.4 | OUT | 1 | S | 05-May | 30.4 | IN | 0 |
| **W** | 02-Dec | 15 | IN | 0 | W | 26-May | 36.4 | OUT | 1 | AN | 05-May | 30.4 | IN | 0 |
| **R** | 03-Dec | 18.6 | IN | 0 | R | 27-May | 26.4 | IN | 0 | H | 05-May | 30.4 | IN | 0 |
| **W** | 03-Dec | 18.6 | IN | 0 | W | 27-May | 26.4 | IN | 0 | Z | 05-May | 30.4 | IN | 0 |
| **R** | 03-Dec | 11 | IN | -1 | R | 27-May | 28.8 | OUT | 0 | S | 08-May | 24.6 | IN | -1 |
| **W** | 03-Dec | 11 | IN | -1 | W | 27-May | 28.8 | OUT | 0 | AN | 08-May | 24.6 | IN | -1 |
| **A** | 04-Dec | 18.3 | IN | 1 | R | 28-May | 28.3 | IN | 0 | H | 08-May | 24.6 | IN | -1 |
| **M** | 04-Dec | 18.3 | IN | 1 | W | 28-May | 28.3 | IN | 0 | Z | 08-May | 24.6 | IN | -1 |
| **R** | 04-Dec | 11.6 | OUT | -2 | M | 28-May | 28.3 | IN | 0 | H | 09-May | 26.8 | IN | 0 |
| **W** | 04-Dec | 11.6 | OUT | -2 | R | 28-May | 29.2 | OUT | 0 | Z | 09-May | 26.8 | IN | 0 |
| **R** | 05-Dec | 19.3 | IN | 0 | W | 28-May | 29.2 | OUT | 0 | S | 09-May | 26.8 | IN | 0 |
| **W** | 05-Dec | 19.3 | IN | 0 | R | 29-May | 24.4 | IN | 0 | AN | 09-May | 26.8 | IN | 0 |
| **A** | 05-Dec | 19.3 | IN | 0 | W | 29-May | 24.4 | IN | 0 | S | 10-May | 28.3 | IN | 0 |
| **M** | 06-Dec | 20 | IN | 0 | M | 29-May | 24.4 | IN | 0 | AN | 10-May | 28.3 | IN | 0 |
| **R** | 06-Dec | 20 | IN | 0 | R | 29-May | 30.3 | OUT | 0 | H | 10-May | 28.3 | IN | 0 |
| **W** | 06-Dec | 20 | IN | 0 | M | 29-May | 30.3 | OUT | 0 | S | 12-May | 26.1 | IN | 1 |
| **R** | 06-Dec | 15.8 | OUT | -1 | W | 29-May | 30.3 | OUT | 0 | H | 12-May | 26.1 | IN | 1 |
| **W** | 06-Dec | 15.8 | OUT | -1 | R | 30-May | 26.2 | IN | 0 | Z | 12-May | 26.1 | IN | 1 |
| **R** | 07-Dec | 19 | IN | 0 | W | 30-May | 26.2 | IN | 0 | S | 13-May | 26.6 | IN | 0 |
| **M** | 07-Dec | 19 | IN | 0 | R | 30-May | 28.8 | OUT | 0 | H | 13-May | 26.6 | IN | 0 |
| **A** | 07-Dec | 19 | IN | 0 | W | 30-May | 28.8 | OUT | 0 | Z | 13-May | 26.6 | IN | 0 |
| **R** | 07-Dec | 16.7 | OUT | -1 | R | 31-May | 26.9 | IN | 1 | S | 14-May | 30.8 | IN | 0 |
| **W** | 07-Dec | 16.7 | OUT | -1 | W | 31-May | 26.9 | IN | 1 | H | 14-May | 30.8 | IN | 0 |
| **R** | 09-Dec | 16.6 | IN | -2 | R | 31-May | 30.8 | OUT | 1 | AN | 14-May | 30.8 | IN | 0 |
| **W** | 09-Dec | 16.6 | IN | -2 | W | 31-May | 30.8 | OUT | 1 | Z | 14-May | 30.8 | IN | 0 |
| **M** | 09-Dec | 16.6 | IN | -2 | A | 31-May | 30.8 | OUT | 1 | AN | 16-May | 28.9 | IN | 0 |
| **A** | 09-Dec | 16.6 | IN | -2 | R | 01-Jun | 26.9 | IN | 0 | H | 16-May | 28.9 | IN | 0 |
| **R** | 11-Dec | 16.5 | IN | 0 | M | 01-Jun | 26.9 | IN | 0 | S | 16-May | 28.9 | IN | 0 |
| **W** | 11-Dec | 16.5 | IN | 0 | W | 01-Jun | 26.9 | IN | 0 | Z | 16-May | 28.9 | IN | 0 |
| **R** | 11-Dec | 12.4 | OUT | -2 | A | 01-Jun | 26.9 | IN | 0 | AN | 17-May | 29.4 | IN | 0 |
| **W** | 11-Dec | 12.4 | OUT | -2 | R | 01-Jun | 28.5 | OUT | 0 | H | 17-May | 29.4 | IN | 0 |
| **R** | 13-Dec | 17.2 | IN | 0 | W | 01-Jun | 28.5 | OUT | 0 | Z | 17-May | 29.4 | IN | 0 |
| **M** | 13-Dec | 17.2 | IN | 0 | M | 01-Jun | 28.5 | OUT | 0 | S | 17-May | 29.4 | IN | 0 |
| **W** | 13-Dec | 17.2 | IN | 0 | A | 01-Jun | 28.5 | OUT | 0 | AN | 18-May | 26.8 | IN | 0 |
| **A** | 13-Dec | 17.2 | IN | 0 | R | 02-Jun | 24.9 | IN | -1 | S | 18-May | 26.8 | IN | 0 |
| **R** | 13-Dec | 10.4 | OUT | 2 | W | 02-Jun | 24.9 | IN | -1 | H | 18-May | 26.8 | IN | 0 |
| **A** | 13-Dec | 10.4 | OUT | -2 | R | 03-Jun | 28.3 | OUT | 0 | Z | 18-May | 26.8 | IN | 0 |
| **W** | 13-Dec | 10.4 | OUT | -2 | W | 03-Jun | 28.3 | OUT | 0 | AN | 19-May | 29.3 | IN | 0 |
| **R** | 14-Dec | 17 | IN | 0 | M | 03-Jun | 28.3 | OUT | 0 | S | 19-May | 26.8 | IN | 0 |
| **A** | 14-Dec | 17 | IN | 0 | A | 03-Jun | 28.3 | OUT | 0 | H | 19-May | 26.8 | IN | 0 |
| **R** | 15-Dec | 17.8 | IN | 0 | R | 04-Jun | 26.3 | IN | 0 | Z | 19-May | 26.8 | IN | 0 |
| **A** | 15-Dec | 17.8 | IN | 0 | W | 04-Jun | 26.3 | IN | 0 | AH | 20-May | 27.2 | IN | -1 |
| **R** | 15-Dec | 17.1 | OUT | 0 | M | 04-Jun | 26.3 | IN | 0 | H | 20-May | 27.2 | IN | -1 |
| **W** | 15-Dec | 17.1 | OUT | 0 | R | 04-Jun | 29.3 | OUT | 1 | Z | 20-May | 27.2 | IN | -1 |
| **R** | 16-Dec | 17.8 | IN | 0 | M | 04-Jun | 29.3 | OUT | 1 | S | 20-May | 27.2 | IN | -1 |
| **W** | 16-Dec | 17.8 | IN | 0 | W | 04-Jun | 29.3 | OUT | 1 | AN | 21-May | 30.4 | IN | 1 |
| **R** | 08-Dec | 17.7 | IN | 0 | R | 05-Jun | 29.2 | OUT | 0 | H | 21-May | 30.4 | IN | 1 |
| **W** | 08-Dec | 17.7 | IN | 0 | M | 05-Jun | 29.2 | OUT | 0 | Z | 21-May | 30.4 | IN | 1 |
| **A** | 08-Dec | 17.7 | IN | 0 | W | 05-Jun | 29.2 | OUT | 0 | S | 21-May | 30.4 | IN | 1 |
| **R** | 08-Dec | 11.3 | OUT | -2 | R | 05-Jun | 27.7 | IN | 0 | WA | 21-May | 30.4 | IN | 1 |
| **W** | 08-Dec | 11.3 | OUT | -2 | M | 05-Jun | 27.7 | IN | 0 | M | 21-May | 30.4 | IN | 1 |
| **A** | 08-Dec | 11.3 | OUT | -2 | W | 05-Jun | 27.7 | IN | 0 | R | 21-May | 30.4 | IN | 1 |
| **R** | 20-Dec | 18.4 | IN | -1 | R | 06-Jun | 28.5 | IN | 0 | AN | 22-May | 31.5 | IN | 0 |
| **M** | 20-Dec | 18.4 | IN | -1 | W | 06-Jun | 28.5 | IN | 0 | H | 22-May | 31.5 | IN | 0 |
| **W** | 20-Dec | 18.4 | IN | -1 | R | 06-Jun | 36.6 | OUT | 1 | Z | 22-May | 31.5 | IN | 0 |
| **A** | 20-Dec | 18.4 | IN | -1 | W | 06-Jun | 36.6 | OUT | 1 | S | 22-May | 31.5 | IN | 0 |
| **R** | 20-Dec | 14.7 | OUT | -2 | R | 07-Jun | 25.8 | IN | 0 | WA | 22-May | 31.5 | IN | 0 |
| **W** | 20-Dec | 14.7 | OUT | -2 | W | 07-Jun | 25.8 | IN | 0 | R | 22-May | 31.5 | IN | 0 |
| **R** | 21-Dec | 19.7 | OUT | 0 | R | 07-Jun | 25.8 | IN | 0 | M | 22-May | 31.5 | IN | 0 |
| **W** | 21-Dec | 19.7 | IN | 0 | R | 30-Jun | 25.6 | IN | -1 | AN | 23-May | 31.9 | IN | 0 |
| **R** | 22-Dec | 20.6 | IN | 0 | W | 30-Jun | 25.6 | IN | -1 | H | 23-May | 31.9 | IN | 0 |
| **W** | 22-Dec | 20.6 | IN | 0 | R | 30-Jun | 31.2 | OUT | 0 | Z | 23-May | 31.9 | IN | 0 |
| **M** | 22-Dec | 20.6 | IN | 0 | W | 30-Jun | 31.2 | OUT | 0 | S | 23-May | 31.9 | IN | 0 |
| **A** | 22-Dec | 20.6 | IN | 0 | R | 04-Jul | 29.6 | IN | 0 | WA | 23-May | 31.9 | IN | 0 |
| **R** | 23-Dec | 20.6 | IN | 0 | A | 04-Jul | 29.6 | IN | 0 | M | 23-May | 31.9 | IN | 0 |
| **R** | 23-Dec | 17.7 | OUT | 0 | R | 04-Jul | 39.9 | OUT | 2 | R | 23-May | 31.9 | IN | 0 |
| **W** | 23-Dec | 17.7 | OUT | 0 | A | 04-Jul | 39.9 | OUT | 2 | H | 24-May | 25.6 | IN | -1 |
| **R** | 25-Dec | 20.3 | IN | 0 | R | 05-Jul | 27.8 | IN | 0 | Z | 24-May | 25.6 | IN | -1 |
| **A** | 25-Dec | 20.3 | IN | 0 | W | 05-Jul | 27.8 | IN | 0 | S | 24-May | 25.6 | IN | -1 |
| **M** | 25-Dec | 20.3 | IN | 0 | R | 05-Jul | 37.6 | OUT | 2 | WA | 24-May | 25.6 | IN | -1 |
| **R** | 25-Dec | 16.6 | OUT | 0 | W | 05-Jul | 37.6 | OUT | 2 | R | 24-May | 25.6 | IN | 1 |
| **W** | 25-Dec | 16.6 | OUT | 0 | R | 06-Jul | 27.7 | IN | -1 | AN | 25-May | 29.6 | IN | 1 |
| **M** | 25-Dec | 16.6 | OUT | 0 | W | 06-Jul | 27.7 | IN | -1 | H | 25-May | 29.6 | IN | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R** | 26-Dec | 20.9 | IN | 0 | R | 06-Jul | 19.7 | OUT | 2 | Z | 25-May | 29.6 | IN | 1 |
| **W** | 26-Dec | 20.9 | IN | 0 | W | 06-Jul | 19.7 | OUT | 2 | S | 25-May | 29.6 | IN | 1 |
| **R** | 26-Dec | 13.6 | OUT | -1 | R | 07-Jul | 24.9 | IN | 0 | WA | 25-May | 29.6 | IN | 1 |
| **A** | 26-Dec | 13.6 | OUT | -1 | W | 07-Jul | 24.9 | IN | 0 | M | 25-May | 29.6 | IN | 1 |
| **R** | 27-Dec | 18.8 | IN | -1 | M | 07-Jul | 24.9 | IN | 0 | R | 25-May | 29.6 | IN | 1 |
| **W** | 27-Dec | 18.8 | IN | -1 | R | 07-Jun | 30.3 | OUT | 0 | H | 27-May | 26.1 | IN | 0 |
| **R** | 27-Dec | 11.8 | OUT | -2 | W | 07-Jun | 30.3 | OUT | 0 | Z | 27-May | 26.1 | IN | 0 |
| **W** | 27-Dec | 11.8 | OUT | -2 | M | 07-Jun | 30.3 | OUT | 0 | S | 27-May | 26.1 | IN | 0 |
| **R** | 28-Dec | 18 | IN | 0 | A | 07-Jun | 30.3 | OUT | 0 | R | 27-May | 26.1 | IN | 0 |
| **M** | 28-Dec | 18 | IN | 0 | R | 08-Jun | 27.8 | IN | 0 | M | 27-May | 26.1 | IN | 0 |
| **R** | 30-Dec | 18.2 | IN | 0 | W | 08-Jun | 27.8 | IN | 0 | WA | 27-May | 26.1 | IN | 0 |
| **W** | 30-Dec | 18.7 | IN | 0 | M | 08-Jun | 27.8 | IN | 0 | S | 28-May | 25.8 | IN | -1 |
| **M** | 30-Dec | 18.7 | IN | 0 | A | 08-Jun | 27.8 | IN | 0 | H | 28-May | 25.8 | IN | -1 |
| **R** | 01-Jan | 19.2 | IN | 0 | R | 08-Jun | 32 | OUT | 0 | Z | 28-May | 25.8 | IN | -1 |
| **M** | 01-Jan | 19.2 | IN | 0 | M | 08-Jun | 32 | OUT | 0 | M | 28-May | 25.8 | IN | -1 |
| **A** | 01-Jan | 19.2 | IN | 0 | W | 08-Jun | 32 | OUT | 0 | R | 28-May | 25.8 | IN | -1 |
| **R** | 01-Jan | 19.7 | OUT | 0 | R | 09-Jun | 28.5 | IN | 0 | WA | 28-May | 25.8 | IN | -1 |
| **M** | 01-Jan | 19.7 | OUT | 0 | W | 09-Jun | 28.5 | IN | 0 | AN | 30-May | 25.6 | IN | 0 |
| **A** | 01-Jan | 19.7 | OUT | 0 | M | 09-Jun | 28.5 | IN | 0 | H | 30-May | 25.6 | IN | 0 |
| **R** | 02-Jan | 18.6 | IN | 0 | R | 09-Jun | 31.9 | OUT | 1 | Z | 30-May | 25.6 | IN | 0 |
| **W** | 02-Jan | 18.6 | IN | 0 | W | 09-Jun | 31.9 | OUT | 1 | S | 30-May | 25.6 | IN | 0 |
| **D** | 02-Jan | 18.6 | IN | 0 | M | 09-Jun | 31.9 | OUT | 1 | WA | 30-May | 25.6 | IN | 0 |
| **B** | 02-Jan | 18.6 | IN | 0 | R | 10-Jun | 27.3 | IN | 0 | R | 30-May | 25.6 | IN | 0 |
| **R** | 03-Jan | 18.6 | IN | -2 | M | 10-Jun | 27.3 | IN | 0 | M | 30-May | 25.6 | IN | 0 |
| **A** | 03-Jan | 18.6 | IN | -2 | R | 12-Jun | 30.7 | OUT | 0 | AN | 01-Jun | 24.1 | IN | -1 |
| **W** | 03-Jan | 18.6 | IN | -2 | W | 12-Jun | 30.7 | OUT | 0 | H | 01-Jun | 24.1 | IN | -1 |
| **R** | 04-Jan | 18 | IN | 0 | M | 12-Jun | 30.7 | OUT | 0 | Z | 01-Jun | 24.1 | IN | -1 |
| **W** | 04-Jan | 18 | IN | 0 | R | 13-Jun | 31.9 | IN | 1 | WA | 01-Jun | 24.1 | IN | -1 |
| **R** | 04-Jan | 14.3 | OUT | -2 | M | 13-Jun | 31.9 | IN | 1 | R | 01-Jun | 24.1 | IN | -1 |
| **A** | 04-Jan | 14.3 | OUT | -2 | A | 13-Jun | 31.9 | IN | 1 | M | 01-Jun | 24.1 | IN | -1 |
| **R** | 06-Jan | 18.8 | IN | 0 | R | 13-Jun | 30.4 | OUT | 0 | H | 03-Jun | 30.8 | IN | 0 |
| **A** | 06-Jan | 18.8 | IN | 0 | W | 13-Jun | 30.4 | OUT | 0 | Z | 03-Jun | 30.8 | IN | 0 |
| **M** | 06-Jan | 18.8 | IN | 0 | R | 16-Jun | 27.1 | IN | -1 | S | 03-Jun | 30.8 | IN | 0 |
| **W** | 06-Jan | 18.8 | IN | 0 | W | 16-Jun | 27.1 | IN | -1 | M | 03-Jun | 30.8 | IN | 0 |
| **R** | 06-Jan | 15.6 | OUT | 0 | R | 16-Jun | 31.4 | OUT | 0 | R | 03-Jun | 30.8 | IN | 0 |
| **W** | 06-Jan | 15.6 | OUT | 0 | W | 16-Jun | 31.4 | OUT | 0 | WA | 03-Jun | 30.8 | IN | 0 |
| **R** | 07-Jan | 12.9 | OUT | -1 | R | 18-Jun | 27.9 | IN | 0 | AN | 04-Jun | 28 | IN | 0 |
| **A** | 07-Jan | 12.9 | OUT | -1 | W | 18-Jun | 27.9 | IN | 0 | H | 04-Jun | 28 | IN | 0 |
| **R** | 07-Jan | 21.1 | IN | -1 | R | 18-Jun | 33.4 | OUT | 1 | Z | 04-Jun | 28 | IN | 0 |
| **W** | 07-Jan | 21.1 | IN | -1 | W | 18-Jun | 33.4 | OUT | 1 | S | 04-Jun | 28 | IN | 0 |
| **R** | 08-Jan | 17.6 | IN | -1 | R | 19-Jun | 29.7 | IN | 1 | WA | 04-Jun | 28 | IN | 0 |
| **W** | 08-Jan | 17.6 | IN | -1 | W | 19-Jun | 29.7 | IN | 1 | R | 04-Jun | 28 | IN | 0 |
| **R** | 08-Jan | 12.3 | OUT | -2 | A | 19-Jun | 29.7 | IN | 1 | AN | 06-Jun | 24.5 | IN | 1 |
| **A** | 08-Jan | 12.3 | OUT | -2 | R | 23-Jun | 24.7 | IN | -1 | H | 06-Jun | 24.5 | IN | 1 |
| **R** | 09-Jan | 18 | IN | -1 | W | 23-Jun | 24.7 | IN | -1 | Z | 06-Jun | 24.5 | IN | 1 |
| **W** | 09-Jan | 18 | IN | -1 | A | 23-Jun | 24.7 | IN | -1 | S | 06-Jun | 24.5 | IN | 1 |
| **M** | 09-Jan | 18 | IN | -1 | R | 26-Jun | 26.6 | IN | 0 | AN | 07-Jun | 30.3 | IN | 2 |
| **A** | 09-Jan | 18 | IN | -1 | M | 26-Jun | 26.6 | IN | 0 | H | 07-Jun | 30.3 | IN | 2 |
| **R** | 09-Jan | 10.9 | OUT | -2 | A | 26-Jun | 26.6 | IN | 0 | Z | 07-Jun | 30.3 | IN | 2 |
| **R** | 10-Jan | 17.5 | IN | -1 | W | 26-Jun | 26.6 | IN | 0 | S | 07-Jun | 30.3 | IN | 2 |
| **W** | 10-Jan | 17.5 | IN | -1 | R | 26-Jun | 34.3 | OUT | 1 | H | 08-Jun | 30.4 | IN | 1 |
| **R** | 10-Jan | 16.6 | OUT | -2 | A | 26-Jun | 34.3 | OUT | 1 | S | 08-Jun | 30.4 | IN | 1 |
| **A** | 10-Jan | 16.6 | OUT | -2 | R | 27-Jun | 26.8 | IN | 0 | Z | 08-Jun | 30.4 | IN | 1 |
| **R** | 11-Jan | 17.9 | IN | 1 | A | 27-Jun | 26.8 | IN | 0 | R | 08-Jun | 30.4 | IN | 1 |
| **W** | 11-Jan | 17.9 | IN | 1 | W | 27-Jun | 26.8 | IN | 0 | WA | 08-Jun | 30.4 | IN | 1 |
| **R** | 11-Jan | 11.1 | OUT | -1 | R | 27-Jun | 36.5 | OUT | 2 | AN | 01-Jul | 27.3 | IN | 0 |
| **W** | 11-Jan | 11.1 | OUT | -1 | W | 27-Jun | 36.5 | OUT | 2 | H | 01-Jul | 27.3 | IN | 0 |
| **R** | 13-Jan | 17.4 | IN | -1 | A | 27-Jun | 36.5 | OUT | 2 | Z | 01-Jul | 27.3 | IN | 0 |
| **W** | 13-Jan | 17.4 | IN | -1 | R | 28-Jun | 25.9 | IN | 0 | S | 01-Jul | 27.3 | IN | 0 |
| **R** | 13-Jan | 11.3 | OUT | -2 | W | 28-Jun | 25.9 | IN | 0 | AN | 03-Jul | 24.8 | IN | 0 |
| **W** | 13-Jan | 11.3 | OUT | -2 | R | 28-Jun | 34.3 | OUT | 2 | H | 03-Jul | 24.8 | IN | 0 |
| **R** | 15-Jan | 17.7 | IN | 0 | W | 28-Jun | 34.3 | OUT | 2 | Z | 03-Jul | 24.8 | IN | 0 |
| **A** | 15-Jan | 17.7 | IN | 0 | R | 30-Jun | 25.6 | IN | -1 | S | 03-Jul | 24.8 | IN | 0 |
| **R** | 15-Jan | 11.7 | OUT | -2 | W | 30-Jun | 25.6 | IN | -1 | AN | 04-Jul | 31.4 | IN | 0 |
| **W** | 15-Jan | 11.7 | OUT | -2 | R | 30-Jun | 31.2 | OUT | 0 | H | 04-Jul | 31.4 | IN | 0 |
| **R** | 17-Jan | 16.9 | IN | -1 | W | 30-Jun | 31.2 | OUT | 0 | Z | 04-Jul | 31.4 | IN | 0 |
| **A** | 17-Jan | 16.9 | IN | -1 | R | 04-Jul | 29.6 | IN | 0 | S | 04-Jul | 31.4 | IN | 0 |
| **M** | 17-Jan | 16.9 | IN | -1 | A | 04-Jul | 29.6 | IN | 0 | AN | 05-Jul | 33.9 | IN | 0 |
| **R** | 17-Jan | 12.2 | OUT | -2 | R | 04-Jul | 39.9 | OUT | 2 | H | 05-Jul | 33.9 | IN | 0 |
| **W** | 17-Jan | 12.2 | OUT | -2 | A | 04-Jul | 39.9 | OUT | 2 | Z | 05-Jul | 33.9 | IN | 0 |
| **R** | 18-Jan | 17.5 | IN | 0 | R | 05-Jul | 27.8 | IN | 0 | S | 05-Jul | 33.9 | IN | 0 |
| **R** | 18-Jan | 13.4 | IN | -1 | W | 05-Jul | 27.8 | IN | 0 | AN | 06-Jul | 29.3 | IN | 0 |
| **R** | 19-Jan | 17.6 | IN | 0 | R | 05-Jul | 37.6 | OUT | 2 | H | 06-Jul | 29.3 | IN | 0 |
| **W** | 19-Jan | 17.6 | IN | 0 | W | 05-Jul | 37.6 | OUT | 2 | S | 06-Jul | 29.3 | IN | 0 |
| **A** | 19-Jan | 17.6 | IN | 0 | R | 06-Jul | 27.7 | IN | -1 | H | 09-Jun | 31.9 | IN | 1 |
| **R** | 19-Jan | 15.7 | OUT | -2 | W | 06-Jul | 27.7 | IN | -1 | Z | 09-Jun | 31.9 | IN | 1 |
| **W** | 19-Jan | 15.7 | OUT | -2 | R | 07-Mar | 39.7 | OUT | 2 | WA | 09-Jun | 31.9 | IN | 1 |
| **R** | 20-Jan | 17.6 | IN | 0 | W | 07-Mar | 39.7 | OUT | 2 | S | 09-Jun | 31.9 | IN | 1 |
| **W** | 20-Jan | 17.6 | IN | 0 | R | 07-Jul | 24.9 | IN | 0 | R | 09-Jun | 31.9 | IN | 1 |
| **R** | 20-Jan | 13.4 | OUT | -1 | W | 07-Jul | 24.9 | IN | 0 | M | 09-Jun | 31.9 | IN | 1 |
| **W** | 20-Jan | 13.4 | OUT | 1 | M | 07-Jul | 24.9 | IN | 0 | H | 10-Jun | 30.2 | IN | 0 |
| **R** | 21-Jan | 17.1 | IN | 0 | R | 07-Jul | 24.8 | OUT | 2 | Z | 10-Jun | 30.2 | IN | 0 |
| **W** | 21-Jan | 17 | IN | 0 | W | 07-Jul | 24.8 | OUT | 2 | WA | 10-Jun | 30.2 | IN | 0 |
| **R** | 21-Jan | 8.4 | OUT | -2 | R | 08-Jul | 32.1 | IN | 1 | S | 10-Jun | 30.2 | IN | 0 |
| **W** | 21-Jan | 8.4 | OUT | -2 | W | 08-Jul | 32.1 | IN | 1 | R | 10-Jun | 30.2 | IN | 0 |
| **A** | 21-Jan | 8.4 | OUT | -2 | M | 08-Jul | 32.1 | IN | 1 | M | 10-Jun | 30.2 | IN | 0 |
| **M** | 21-Jan | 8.4 | OUT | -2 | A | 08-Jul | 32.1 | IN | 1 | AN | 10-Jun | 30.2 | IN | 0 |
| **R** | 22-Jan | 17.2 | IN | 0 | R | 08-Jul | 39.6 | OUT | 2 | AN | 12-Jun | 27.6 | IN | 0 |
| **A** | 22-Jan | 17.2 | IN | 0 | A | 08-Jul | 39.6 | OUT | 2 | H | 12-Jun | 27.6 | IN | 0 |
| **W** | 22-Jan | 17.2 | IN | 0 | M | 08-Jul | 39.6 | OUT | 2 | Z | 12-Jun | 27.6 | IN | 0 |
| **R** | 22-Jan | 11.4 | OUT | -1 | W | 08-Jul | 39.6 | OUT | 2 | S | 12-Jun | 27.6 | IN | 0 |
| **A** | 22-Jan | 11.4 | OUT | -1 | E | 09-Jul | 24.8 | IN | -1 | WA | 12-Jun | 27.6 | IN | 0 |
| **W** | 22-Jan | 11.4 | OUT | -1 | W | 09-Jul | 24.8 | IN | -1 | R | 12-Jun | 27.6 | IN | 0 |
| **R** | 24-Jan | 17.4 | IN | 0 | E | 10-Jul | 34.2 | OUT | 1 | AN | 16-Jun | 33.6 | IN | 1 |
| **W** | 24-Jan | 17.4 | IN | 0 | M | 10-Jul | 34.2 | OUT | 1 | H | 16-Jun | 33.6 | IN | 1 |
| **M** | 24-Jan | 17.4 | IN | 0 | R | 10-Jul | 29.3 | IN | 0 | Z | 16-Jun | 33.6 | IN | 1 |
| **R** | 24-Jan | 14.3 | OUT | 0 | W | 10-Jul | 29.3 | IN | 0 | S | 16-Jun | 33.6 | IN | 1 |
| **W** | 24-Jan | 14.3 | OUT | 0 | R | 11-Jul | 31.1 | IN | 0 | WA | 16-Jun | 33.6 | IN | 1 |
| **A** | 24-Jan | 14.3 | OUT | 0 | R | 11-Jul | 34.9 | OUT | 1 | R | 16-Jun | 33.6 | IN | 1 |
| **R** | 25-Jan | 17.3 | IN | 0 | W | 11-Jul | 34.9 | OUT | 1 | AN | 17-Jun | 27.2 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **M** | 25-Jan | 17.3 | IN | 0 | R | 07-Jul | 24.8 | OUT | 2 | H | 17-Jun | 27.2 | IN | 0 |
| **R** | 25-Jan | 13.4 | OUT | 1 | W | 07-Jul | 24.8 | OUT | 2 | Z | 17-Jun | 27.2 | IN | 0 |
| **R** | 26-Jan | 18.6 | IN | 0 | R | 08-Jul | 32.1 | IN | 1 | S | 17-Jun | 27.2 | IN | 0 |
| **A** | 26-Jan | 18.6 | IN | 0 | W | 08-Jul | 32.1 | IN | 1 | WA | 17-Jun | 27.2 | IN | 0 |
| **M** | 26-Jan | 18.6 | IN | 0 | M | 08-Jul | 32.1 | IN | 1 | R | 17-Jun | 27.2 | IN | 0 |
| **W** | 26-Jan | 15.6 | OUT | 0 | A | 08-Jul | 32.1 | IN | 1 | M | 17-Jun | 27.2 | IN | 0 |
| **R** | 27-Jan | 18.1 | IN | 0 | R | 08-Jul | 39.6 | OUT | 2 | AN | 18-Jun | 30.6 | IN | 0 |
| **W** | 27-Jan | 18.1 | IN | 0 | A | 08-Jul | 39.6 | OUT | 2 | H | 18-Jun | 30.6 | IN | 0 |
| **R** | 27-Jan | 15.4 | OUT | 0 | M | 08-Jul | 39.6 | OUT | 2 | Z | 18-Jun | 30.6 | IN | 0 |
| **W** | 27-Jan | 15.4 | OUT | 0 | W | 08-Jul | 39.6 | OUT | 2 | WA | 18-Jun | 30.6 | IN | 0 |
| **R** | 29-Jan | 15.6 | IN | 0 | R | 09-Jul | 24.8 | IN | -1 | AN | 18-Jun | 30.6 | IN | 0 |
| **A** | 29-Jan | 15.6 | IN | 0 | W | 09-Jul | 24.8 | IN | -1 | M | 18-Jun | 30.6 | IN | 0 |
| **WA** | 19-Jun | 29.1 | IN | 0 | DE | 03-Nov | 21.2 | OUT | -2 | G-RE | 12-Jan | 21.9 | IN | 0 |
| **H** | 19-Jun | 29.1 | IN | 0 | EB | 03-Nov | 21.2 | OUT | -2 | G-RA | 12-Jan | 21.9 | IN | 0 |
| **Z** | 19-Jun | 29.1 | IN | 0 | G-ER | 03-Nov | 21.2 | OUT | -3 | G-GH | 12-Jan | 21.9 | IN | 0 |
| **S** | 19-Jun | 29.1 | IN | 0 | G-AB | 03-Nov | 21.2 | OUT | -3 | AL | 12-Jan | 21.9 | IN | 0 |
| **R** | 19-Jun | 29.1 | IN | 0 | AL | 03-Nov | 21.2 | OUT | 0 | EB | 12-Jan | 21.9 | IN | -1 |
| **M** | 19-Jun | 29.1 | IN | 0 | G-SIN | 03-Nov | 21.2 | OUT | -2 | DE | 13-Jan | 22.3 | OUT | 0 |
| **AN** | 19-Jun | 29.1 | IN | 0 | EB | 03-Nov | 21.2 | OUT | -2 | G-RE | 13-Jan | 22.3 | OUT | -1 |
| **WA** | 21-Jun | 29.4 | IN | 0 | DE | 03-Nov | 25 | IN | 0 | G-GH | 13-Jan | 22.3 | OUT | -2 |
| **H** | 21-Jun | 29.4 | IN | 0 | EN | 03-Nov | 25 | IN | 1 | G-RA | 13-Jan | 22.3 | OUT | -2 |
| **Z** | 21-Jun | 29.4 | IN | 0 | AL | 03-Nov | 25 | IN | 0 | G-SIN | 13-Jan | 22.3 | OUT | -1 |
| **S** | 21-Jun | 29.4 | IN | 0 | AB | 03-Nov | 25 | IN | 0 | AL | 13-Jan | 22.3 | OUT | 0 |
| **R** | 21-Jun | 29.4 | IN | 0 | G-RE | 03-Nov | 25.3 | IN | -2 | G-MOS2 | 13-Jan | 22.3 | OUT | -1 |
| **M** | 21-Jun | 29.4 | IN | 0 | G-SE | 03-Nov | 25.3 | IN | 0 | DE | 13-Jan | 21.8 | IN | -1 |
| **AN** | 21-Jun | 29.4 | IN | 0 | AL | 03-Nov | 25.3 | IN | 0 | EB | 13-Jan | 21.8 | IN | -1 |
| **H** | 22-Jun | 28.8 | IN | 1 | EN | 03-Nov | 25.3 | IN | 1 | AL | 13-Jan | 21.8 | IN | -1 |
| **Z** | 22-Jun | 28.8 | IN | 1 | G-RA | 03-Nov | 25.3 | IN | 3 | DE | 14-Jan | 20.8 | IN | -1 |
| **AN** | 22-Jun | 28.8 | IN | 1 | EB | 03-Nov | 25.3 | IN | 0 | AL | 14-Jan | 20.8 | IN | -1 |
| **S** | 22-Jun | 28.8 | IN | 1 | G-GH | 03-Nov | 25.3 | IN | 1 | EB | 14-Jan | 20.8 | IN | -1 |
| **AN** | 24-Jun | 28.1 | IN | 0 | DE | 03-Nov | 25.3 | IN | 1 | DE | 16-Jan | 20.9 | IN | 0 |
| **H** | 24-Jun | 28.1 | IN | 0 | EN | 04-Nov | 25.2 | IN | 0 | AB | 16-Jan | 20.9 | IN | 0 |
| **Z** | 24-Jun | 28.1 | IN | 0 | AL | 04-Nov | 25.2 | IN | 0 | AL | 16-Jan | 20.9 | IN | 0 |
| **S** | 24-Jun | 28.1 | IN | 0 | DE | 04-Nov | 25.2 | IN | 0 | EB | 16-Jan | 20.9 | IN | -1 |
| **AN** | 26-Jun | 32.2 | IN | 1 | AB | 04-Nov | 25.2 | IN | 0 | G-GH | 16-Jan | 20.9 | IN | -1 |
| **H** | 26-Jun | 32.2 | IN | 1 | EB | 04-Nov | 25.2 | IN | 0 | G-SIN | 16-Jan | 20.9 | IN | 0 |
| **Z** | 26-Jun | 32.2 | IN | 1 | G-MA | 04-Nov | 24.9 | IN | 0 | DE | 17-Jan | 19.7 | IN | 0 |
| **S** | 26-Jun | 32.2 | IN | 1 | G-SA | 04-Nov | 24.9 | IN | 0 | EB | 17-Jan | 19.7 | IN | -1 |
| **AN** | 27-Jun | 27.4 | IN | 0 | G-AR | 04-Nov | 24.9 | IN | 0 | AL | 17-Jan | 19.7 | IN | -1 |
| **H** | 27-Jun | 27.4 | IN | 0 | G-GH | 04-Nov | 24.9 | IN | 0 | AB | 17-Jan | 19.7 | IN | 0 |
| **Z** | 27-Jun | 27.4 | IN | 0 | G-ZAH | 04-Nov | 24.9 | IN | 0 | DE | 19-Jan | 22.8 | IN | 0 |
| **S** | 27-Jun | 27.4 | IN | 0 | G-WA | 04-Nov | 24.9 | IN | 0 | EB | 19-Jan | 22.8 | IN | 0 |
| **AN** | 28-Jun | 22.4 | IN | 0 | DE | 04-Nov | 24.9 | IN | 0 | AL | 19-Jan | 22.8 | IN | 0 |
| **H** | 28-Jun | 22.4 | IN | 0 | G-RU | 04-Nov | 24.4 | IN | 0 | G-SIN | 19-Jan | 22.8 | IN | 0 |
| **Z** | 28-Jun | 22.4 | IN | 0 | G-MOS | 04-Nov | 24.4 | IN | 0 | G-RE | 19-Jan | 22.8 | IN | 0 |
| **S** | 28-Jun | 22.4 | IN | 0 | DE | 05-Nov | 24.3 | IN | -1 | G-GH | 19-Jan | 22.8 | IN | 0 |
| **H** | 29-Jun | 25.6 | IN | 0 | EB | 05-Nov | 26.1 | IN | 0 | G-RA | 19-Jan | 22.8 | IN | 0 |
| **Z** | 29-Jun | 25.6 | IN | 0 | EN | 05-Nov | 26.1 | IN | 1 | G-MOS2 | 19-Jan | 22.8 | IN | 2 |
| **S** | 29-Jun | 25.6 | IN | 0 | G-ZAH | 05-Nov | 26.1 | IN | 0 | G-AB | 19-Jan | 22.8 | IN | 0 |
| **AN** | 08-Jul | 28.2 | IN | 0 | DE | 05-Nov | 26.1 | IN | 0 | G-SIN | 19-Jan | 17.7 | OUT | -2 |
| **H** | 08-Jul | 28.2 | IN | 0 | AB | 05-Nov | 26.1 | IN | -1 | G-RE | 19-Jan | 17.7 | OUT | -3 |
| **Z** | 08-Jul | 28.2 | IN | 0 | G-EB | 05-Nov | 26.5 | IN | 0 | G-RA | 19-Jan | 17.7 | OUT | -3 |
| **S** | 08-Jul | 28.2 | IN | 0 | G-RE | 05-Nov | 26.5 | IN | 0 | G-MOS2 | 19-Jan | 17.7 | OUT | 0 |
| **WA** | 08-Jul | 28.2 | IN | 0 | G-SIN | 05-Nov | 26.5 | IN | 0 | G-GH | 19-Jan | 17.7 | OUT | -2 |
| **R** | 08-Jul | 28.2 | IN | 0 | AL | 05-Nov | 26.5 | IN | 1 | AL | 19-Jan | 17.7 | OUT | -1 |
| **M** | 08-Jul | 28.2 | IN | 0 | G-ZAH | 05-Nov | 26.5 | IN | 1 | DE | 19-Jan | 17.7 | OUT | -1 |
| **AN** | 08-Jul | 28.2 | IN | 0 | EB | 05-Nov | 26.5 | IN | 0 | AL | 19-Jan | 20.3 | IN | 0 |
| **H** | 09-Jul | 28.9 | IN | 0 | DE | 06-Nov | 24.5 | IN | 0 | G-WA | 19-Jan | 20.3 | IN | 0 |
| **Z** | 09-Jul | 28.9 | IN | 0 | EN | 06-Nov | 25.6 | IN | 1 | EB | 19-Jan | 20.3 | IN | 0 |
| **S** | 09-Jul | 28.9 | IN | 0 | AL | 06-Nov | 25.6 | IN | 1 | AB | 19-Jan | 20.3 | IN | 0 |
| **WA** | 09-Jul | 28.9 | IN | 0 | EB | 06-Nov | 25.6 | IN | 0 | DE | 19-Jan | 20.3 | IN | 0 |
| **M** | 09-Jul | 28.9 | IN | 0 | AB | 06-Nov | 25.6 | IN | 0 | G-RE | 19-Jan | 21.8 | IN | -1 |
| **R** | 09-Jul | 28.9 | IN | 0 | DE | 06-Nov | 25.6 | IN | 0 | G-RA | 19-Jan | 21.8 | IN | 0 |
| **AN** | 10-Jul | 26.7 | IN | 0 | G-ZAH | 06-Nov | 25.6 | IN | 0 | G-MOS2 | 19-Jan | 21.8 | IN | 0 |
| **H** | 10-Jul | 26.7 | IN | 0 | DE | 06-Nov | 24.6 | OUT | 0 | G-AB | 19-Jan | 21.8 | IN | 0 |
| **Z** | 10-Jul | 26.7 | IN | 0 | EB | 06-Nov | 24.6 | OUT | 0 | G-WA | 20-Jan | 21.7 | IN | 0 |
| **S** | 10-Jul | 26.7 | IN | 0 | G-SIN | 06-Nov | 25.3 | IN | 0 | DE | 20-Jan | 21.7 | IN | 0 |
| **WA** | 10-Jul | 26.7 | IN | 0 | G-RE | 06-Nov | 25.3 | IN | 0 | EB | 20-Jan | 21.7 | IN | 0 |
| **AN** | 28-Jul | 30.2 | IN | 0 | DE | 07-Nov | 25.2 | IN | 0 | G-GH | 20-Jan | 20.9 | IN | 0 |
| **H** | 28-Jul | 30.2 | IN | 0 | EN | 07-Nov | 26.2 | IN | 0 | AB | 20-Jan | 20.9 | IN | -1 |
| **Z** | 28-Jul | 30.2 | IN | 0 | DE | 07-Nov | 26.2 | IN | 1 | EB | 20-Jan | 20.9 | IN | 0 |
| **S** | 28-Jul | 30.2 | IN | 0 | AL | 07-Nov | 26.2 | IN | 1 | DE | 20-Jan | 20.9 | IN | 0 |
| **WA** | 28-Jul | 30.2 | IN | 0 | AB | 07-Nov | 26.2 | IN | 0 | DE | 20-Jan | 20.3 | IN | 0 |
| **R** | 28-Jul | 30.2 | IN | 0 | G-ZAH | 07-Nov | 26.2 | IN | 0 | AL | 20-Jan | 20.3 | IN | 0 |
| **M** | 28-Jul | 30.2 | IN | 0 | EB | 07-Nov | 26.2 | IN | 1 | AB | 20-Jan | 20.3 | IN | 0 |
| **AN** | 29-Jul | 31.7 | IN | 1 | G-GH | 07-Nov | 26 | IN | 0 | EB | 20-Jan | 20.3 | IN | 0 |
| **H** | 29-Jul | 31.7 | IN | 1 | G-HA | 08-Nov | 25.4 | IN | 0 | G-WA | 20-Jan | 20.3 | IN | 0 |
| **Z** | 29-Jul | 31.7 | IN | 1 | G-WA | 08-Nov | 25.4 | IN | 1 | DE | 22-Jan | 20.7 | IN | 0 |
| **S** | 29-Jul | 31.7 | IN | 1 | G-SIN | 08-Nov | 25.4 | IN | 0 | AB | 22-Jan | 20.7 | IN | 0 |
| **M** | 29-Jul | 31.7 | IN | 1 | G-AH | 08-Nov | 25.4 | IN | 1 | AL | 22-Jan | 20.7 | IN | 0 |
| **R** | 29-Jul | 31.7 | IN | 1 | G-MOS | 08-Nov | 25.4 | IN | 1 | EB | 22-Jan | 20.7 | IN | 0 |
| **WA** | 29-Jul | 31.7 | IN | 1 | EB | 08-Nov | 25.4 | IN | -1 | G-MOS | 22-Jan | 20.7 | IN | 0 |
| **AN** | 31-Jul | 31.7 | IN | 1 | G-ZAH | 08-Nov | 25.4 | IN | 1 | G-RU | 22-Jan | 20.7 | IN | 0 |
| **H** | 31-Jul | 31.7 | IN | 1 | DE | 08-Nov | 24.9 | IN | 0 | G-WA | 22-Jan | 20.7 | IN | -2 |
| **Z** | 31-Jul | 31.7 | IN | 1 | EB | 08-Nov | 24.9 | IN | 0 | DE | 23-Jan | 18.4 | IN | -1 |
| **S** | 31-Jul | 31.7 | IN | 1 | G-SIN | 09-Nov | 25.1 | IN | 0 | AL | 23-Jan | 18.4 | IN | 0 |
| **AN** | 11-Aug | 38.2 | OUT | 2 | G-HA | 09-Nov | 25.1 | IN | 1 | EB | 23-Jan | 18.4 | IN | -1 |
| **H** | 11-Aug | 38.2 | OUT | 2 | G-AH | 09-Nov | 25.1 | IN | 0 | DE | 24-Jan | 19.8 | IN | 0 |
| **Z** | 11-Aug | 38.2 | OUT | 2 | G-RU | 09-Nov | 25.1 | IN | 1 | EB | 24-Jan | 19.8 | IN | 0 |
| **S** | 11-Aug | 38.2 | OUT | 2 | EN | 09-Nov | 25.1 | IN | 0 | AL | 24-Jan | 19.8 | IN | 0 |
| **AN** | 13-Aug | 29.9 | IN | 0 | DE | 09-Nov | 25.1 | IN | 1 | AB | 24-Jan | 19.6 | IN | 0 |
| **H** | 13-Aug | 29.9 | IN | 0 | AL | 09-Nov | 25.1 | IN | 1 | DE | 24-Jan | 19.6 | IN | -1 |
| **Z** | 13-Aug | 29.9 | IN | 0 | G-ALA | 09-Nov | 25.4 | IN | 0 | EB | 25-Jan | 21.5 | IN | -1 |
| **S** | 13-Aug | 29.9 | IN | 0 | G-GH | 09-Nov | 25.4 | IN | 0 | DE | 25-Jan | 21.5 | IN | 0 |
| **M** | 13-Aug | 29.9 | IN | 0 | G-NA | 09-Nov | 25.4 | IN | 0 | AL | 25-Jan | 21.5 | IN | 0 |
| **R** | 13-Aug | 29.9 | IN | 0 | DE | 10-Nov | 22.9 | OUT | -1 | EB | 25-Jan | 21.5 | IN | 0 |
| **WA** | 13-Aug | 29.9 | IN | 0 | G-HA | 10-Nov | 22.9 | OUT | 0 | AB | 25-Jan | 21.5 | IN | 0 |
| **AN** | 15-Aug | 30.7 | IN | 0 | G-RA | 10-Nov | 22.9 | OUT | -1 | G-SIN | 25-Jan | 21.5 | IN | 0 |
| **H** | 15-Aug | 30.7 | IN | 0 | G-AB | 10-Nov | 22.9 | OUT | 0 | G-GH | 25-Jan | 21.5 | IN | 0 |
| **Z** | 15-Aug | 30.7 | IN | 0 | G-MOS | 10-Nov | 22.9 | OUT | -2 | G-RE | 25-Jan | 21.5 | IN | -1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | 15-Aug | 30.7 | IN | 0 | AB | 10-Nov | 22.9 | OUT | 0 | G-AB | 25-Jan | 21.5 | IN | 0 |
| **WA** | 15-Aug | 30.7 | IN | 0 | DE | 11-Nov | 25.3 | IN | 1 | G-SIN | 26-Jan | 11.7 | OUT | -2 |
| **M** | 15-Aug | 30.7 | IN | 0 | EB | 11-Nov | 25.3 | IN | 0 | G-RE | 26-Jan | 11.7 | OUT | -2 |
| **E** | 15-Aug | 30.7 | IN | 0 | AL | 11-Nov | 25.3 | IN | 0 | G-GH | 26-Jan | 11.7 | OUT | -2 |
| **AN** | 23-Jul | 31.1 | IN | 0 | EB | 11-Nov | 25.3 | IN | 1 | AB | 26-Jan | 11.7 | OUT | -2 |
| **H** | 23-Jul | 31.1 | IN | 0 | G-ZAH | 11-Nov | 25.3 | IN | 0 | AL | 26-Jan | 11.7 | OUT | 0 |
| **Z** | 23-Jul | 31.1 | IN | 0 | AB | 11-Nov | 25.3 | IN | 0 | DE | 26-Jan | 20.3 | IN | 0 |
| **S** | 23-Jul | 31.1 | IN | 0 | G-SIN | 11-Nov | 29.7 | IN | 0 | AL | 26-Jan | 20.3 | IN | 0 |
| **AN** | 24-Jul | 33.9 | IN | 2 | G-GH | 11-Nov | 29.7 | IN | 0 | EB | 26-Jan | 20.3 | IN | 0 |
| **H** | 24-Jul | 33.9 | IN | 2 | EB | 11-Nov | 29.7 | IN | 0 | AB | 26-Jan | 20.3 | IN | 0 |
| **Z** | 24-Jul | 33.9 | IN | 2 | EN | 11-Nov | 29.7 | IN | 0 | AL | 28-Jan | 20.1 | IN | 0 |
| **S** | 24-Jul | 33.9 | IN | 2 | G-ZAH | 11-Nov | 29.7 | IN | 0 | DE | 28-Jan | 20.1 | IN | 0 |
| **WA** | 24-Jul | 33.9 | IN | 2 | AL | 11-Nov | 29.7 | IN | 0 | EB | 28-Jan | 20.1 | IN | 0 |
| **M** | 24-Jul | 33.9 | IN | 2 | AB | 11-Nov | 29.7 | IN | 0 | AB | 28-Jan | 20.1 | IN | 0 |
| **R** | 24-Jul | 33.9 | IN | 2 | G-OM | 09-Nov | 25.1 | IN | 1 | G-WA | 28-Jan | 20.1 | IN | 0 |
| **AN** | 25-Jul | 27.4 | IN | 0 | DE | 10-Nov | 25 | IN | 0 | G-GH | 28-Jan | 20.1 | IN | 0 |
| **H** | 25-Jul | 27.4 | IN | 0 | G-RA | 10-Nov | 25 | IN | 0 | G-MA | 28-Jan | 20.1 | IN | 0 |
| **Z** | 25-Jul | 27.4 | IN | 0 | G-HA | 10-Nov | 25 | IN | 1 | G-RU | 28-Jan | 20.1 | IN | 0 |
| **S** | 25-Jul | 27.4 | IN | 0 | G-WA | 10-Nov | 25 | IN | 1 | DE | 29-Jan | 20.2 | IN | 0 |
| **WA** | 25-Jul | 27.4 | IN | 0 | G-SIN | 10-Nov | 25 | IN | 0 | EB | 29-Jan | 20.2 | IN | 0 |
| **M** | 25-Jul | 27.4 | IN | 0 | AL | 10-Nov | 25 | IN | 0 | AL | 29-Jan | 20.2 | IN | 0 |
| **R** | 25-Jul | 27.4 | IN | 0 | EN | 10-Nov | 25 | IN | 0 | G-RA | 30-Jan | 19.8 | IN | 0 |
| **AN** | 26-Aug | 37.4 | OUT | 2 | G-ZAH | 10-Nov | 25 | IN | 0 | G-GIN | 30-Jan | 19.8 | IN | -1 |
| **H** | 26-Aug | 37.4 | OUT | 2 | EB | 10-Nov | 25 | IN | -1 | EB | 30-Jan | 19.8 | IN | 0 |
| **Z** | 26-Aug | 37.4 | OUT | 2 | G-AH | 10-Nov | 25 | IN | 0 | DE | 30-Jan | 19.8 | IN | -1 |
| **S** | 26-Aug | 37.4 | OUT | 2 | DE | 10-Nov | 26.7 | OUT | 0 | DE | 03-Feb | 20.6 | IN | 0 |
| **AN** | 27-Aug | 36.2 | OUT | 3 | G-HA | 10-Nov | 26.7 | OUT | 0 | EB | 03-Feb | 20.6 | IN | -1 |
| **H** | 27-Aug | 36.2 | OUT | 3 | G-MOF | 10-Nov | 25.2 | IN | 2 | AL | 03-Feb | 20.6 | IN | 0 |
| **Z** | 27-Aug | 36.2 | OUT | 3 | G-RE | 10-Nov | 25.2 | IN | 0 | AB | 03-Feb | 20.6 | IN | -2 |
| **S** | 27-Aug | 36.2 | OUT | 3 | G-LE | 10-Nov | 25.2 | IN | 2 | DE | 03-Feb | 20.7 | IN | 0 |
| **AN** | 28-Aug | 32.7 | IN | 2 | G-TA | 10-Nov | 25.2 | IN | 2 | EB | 03-Feb | 20.7 | IN | 0 |
| **H** | 28-Aug | 32.7 | IN | 2 | G-SIN | 10-Nov | 25.2 | IN | 2 | AL | 03-Feb | 20.7 | IN | 0 |
| **Z** | 28-Aug | 32.7 | IN | 2 | G-GH | 10-Nov | 25.2 | IN | 0 | AB | 03-Feb | 20.7 | IN | 0 |
| **S** | 28-Aug | 32.7 | IN | 2 | DE | 14-Nov | 22.2 | IN | -1 | DE | 04-Feb | 19.7 | IN | 0 |
| **S** | 01-Sep | 38.8 | OUT | 2 | EB | 14-Nov | 23.4 | IN | 1 | AL | 04-Feb | 19.7 | IN | 0 |
| **AN** | 01-Sep | 38.8 | OUT | 2 | G-ZAH | 14-Nov | 23.4 | IN | -1 | AB | 04-Feb | 19.7 | IN | 0 |
| **H** | 01-Sep | 38.8 | OUT | 2 | EN | 14-Nov | 23.4 | IN | 0 | EB | 04-Feb | 19.7 | IN | -1 |
| **Z** | 01-Sep | 38.8 | OUT | 2 | DE | 14-Nov | 23.4 | IN | 0 | G-WA | 04-Feb | 19.7 | IN | -1 |
| **H** | 04-Sep | 32 | IN | 2 | EB | 15-Nov | 22.5 | IN | 0 | AL | 05-Feb | 20.9 | IN | 0 |
| **Z** | 04-Sep | 32 | IN | 2 | DE | 15-Nov | 22.5 | IN | 0 | EB | 05-Feb | 20.9 | IN | 0 |
| **S** | 04-Sep | 32 | IN | 2 | DE | 15-Nov | 23.9 | IN | -1 | AB | 05-Feb | 20.9 | IN | 0 |
| **AN** | 20-Sep | 26.6 | IN | 0 | EN | 15-Nov | 23.4 | IN | 1 | DE | 05-Feb | 20.9 | IN | 0 |
| **H** | 20-Sep | 26.6 | IN | 0 | EB | 15-Nov | 23.4 | IN | -1 | G-WA | 05-Feb | 20.9 | IN | 0 |
| **Z** | 20-Sep | 26.6 | IN | 0 | G-ZAH | 15-Nov | 23.4 | IN | 0 | DE | 06-Feb | 21.8 | IN | 0 |
| **S** | 20-Sep | 26.6 | IN | 0 | AL | 15-Nov | 23.4 | IN | 0 | AB | 06-Feb | 21.8 | IN | 0 |
| **AN** | 23-Sep | 39.1 | OUT | 2 | AB | 15-Nov | 23.4 | IN | 0 | EB | 06-Feb | 21.8 | IN | 0 |
| **H** | 23-Sep | 39.1 | OUT | 2 | DE | 15-Nov | 23.4 | IN | 0 | AL | 06-Feb | 21.8 | IN | 0 |
| **Z** | 23-Sep | 39.1 | OUT | 2 | DE | 16-Nov | 22.5 | IN | 0 | G-WA | 06-Feb | 21.8 | IN | 0 |
| **S** | 23-Sep | 39.1 | OUT | 2 | EB | 16-Nov | 22.5 | IN | 0 | G-GH | 07-Feb | 22.1 | IN | 0 |
| **AN** | 24-Sep | 30.3 | IN | 0 | G-ZAH | 16-Nov | 23.5 | IN | 1 | G-WA | 07-Feb | 22.1 | IN | 0 |
| **H** | 24-Sep | 30.3 | IN | 0 | AL | 16-Nov | 23.5 | IN | 0 | DE | 07-Feb | 22.1 | IN | 0 |
| **Z** | 24-Sep | 30.3 | IN | 0 | EN | 16-Nov | 23.5 | IN | 0 | EB | 07-Feb | 22.1 | IN | 0 |
| **S** | 24-Sep | 30.3 | IN | 0 | G-WA | 16-Nov | 23.7 | IN | 0 | AB | 07-Feb | 22.1 | IN | 0 |
| **AN** | 26-Sep | 30 | IN | 2 | G-RU | 16-Nov | 23.7 | IN | 1 | AL | 07-Feb | 22.1 | IN | 0 |
| **G** | 26-Sep | 30 | IN | 2 | G-MOS | 16-Nov | 23.7 | IN | 0 | G-NA | 08-Feb | 22.7 | IN | 0 |
| **Z** | 26-Sep | 30 | IN | 2 | G-SIN | 16-Nov | 23.7 | IN | 0 | G-AL | 08-Feb | 22.7 | IN | 0 |
| **S** | 26-Sep | 30 | IN | 2 | G-RE | 16-Nov | 23.7 | IN | -1 | EB | 08-Feb | 22.7 | IN | 0 |
| **AN** | 02-Oct | 27.3 | IN | -1 | G-GH | 16-Nov | 23.7 | IN | 0 | AL | 08-Feb | 22.7 | IN | 0 |
| **H** | 02-Oct | 27.3 | IN | -1 | G-RA | 16-Nov | 23.7 | IN | 1 | AB | 08-Feb | 22.7 | IN | 0 |
| **S** | 02-Oct | 27.3 | IN | -1 | G-RU | 16-Nov | 20.3 | OUT | 0 | DE | 08-Feb | 22.7 | IN | 0 |
| **So** | 20-Oct | 24.2 | IN | 0 | G-MOS | 16-Nov | 20.3 | OUT | -1 | G-NA | 09-Feb | 12.3 | IN | -1 |
| **So** | 21-Oct | 24.6 | IN | 0 | G-WA | 16-Nov | 20.3 | OUT | 0 | G-AL | 09-Feb | 12.3 | IN | 0 |
| **So** | 22-Oct | 25.6 | IN | 0 | AL | 16-Nov | 20.3 | OUT | -1 | DE | 10-Feb | 21 | IN | 0 |
| **So** | 23-Oct | 24.8 | IN | 0 | DE | 16-Nov | 20.3 | OUT | 0 | AB | 10-Feb | 21 | IN | 0 |
| **So** | 24-Oct | 25.9 | IN | 0 | G-AR | 16-Nov | 20.3 | OUT | 0 | EB | 10-Feb | 21 | IN | 1 |
| **So** | 25-Oct | 25.5 | IN | 0 | G-SIN | 17-Nov | 24.8 | OUT | -2 | G-AR2 | 10-Feb | 20.9 | IN | 0 |
| **So** | 26-Oct | 26.1 | IN | 0 | G-RE | 17-Nov | 24.8 | OUT | -3 | EB | 10-Feb | 20.9 | IN | -1 |
| **So** | 29-Oct | 27.8 | IN | 0 | G-GH | 17-Nov | 24.8 | OUT | -1 | G-MA | 10-Feb | 21.5 | IN | 0 |
| **So** | 30-Oct | 27 | IN | 0 | AL | 17-Nov | 24.8 | OUT | -1 | G-RU | 10-Feb | 21.5 | IN | 3 |
| **So** | 31-Oct | 26.7 | IN | 0 | G-AB | 17-Nov | 24.8 | OUT | 0 | G-MOS | 10-Feb | 21.5 | IN | 1 |
| **So** | 01-Nov | 26.3 | IN | 0 | G-MOS | 17-Nov | 24.8 | OUT | -2 | G-GH | 12-Feb | 22.2 | IN | 0 |
| **So** | 02-Nov | 26.2 | IN | 0 | G-NA | 17-Nov | 23 | IN | 0 | EB | 12-Feb | 22.2 | IN | 0 |
| **So** | 03-Nov | 26.2 | IN | 0 | G-ALA | 17-Nov | 23 | IN | 0 | AB | 12-Feb | 22.2 | IN | 0 |
| **So** | 04-Nov | 24.9 | IN | 0 | EB | 17-Nov | 23 | IN | -1 | DE | 12-Feb | 22.2 | IN | 0 |
| **So** | 05-Nov | 25.2 | IN | 0 | G-ZAH | 17-Nov | 23 | IN | 0 | AL | 12-Feb | 22.2 | IN | 0 |
| **So** | 06-Nov | 25.1 | IN | 0 | EN | 17-Nov | 23 | IN | 0 | DE | 13-Feb | 26.2 | IN | 0 |
| **So** | 07-Nov | 25.7 | IN | 0 | G-SIN | 17-Nov | 23.3 | IN | 0 | AB | 13-Feb | 26.2 | IN | 0 |
| **So** | 08-Nov | 24.6 | IN | 0 | G-RE | 17-Nov | 23.3 | IN | 0 | EB | 13-Feb | 26.2 | IN | -1 |
| **So** | 09-Nov | | IN | 0 | G-GH | 17-Nov | 23.3 | IN | 0 | AL | 14-Feb | 20.9 | IN | 0 |
| **So** | 12-Jan | 23.9 | IN | 0 | G-RA | 17-Nov | 23.3 | IN | 0 | AB | 14-Feb | 20.9 | IN | 0 |
| **So** | 13-Jan | 22.9 | IN | 0 | G-NA | 18-Nov | 21.4 | OUT | 0 | G-WA | 14-Feb | 21.3 | IN | 0 |
| **So** | 14-Jan | 22.2 | IN | 0 | G-ALA | 18-Nov | 21.4 | OUT | 0 | G-RU | 14-Feb | 21.3 | IN | 0 |
| **So** | 15-Jan | 19.9 | IN | 0 | G-AB | 18-Nov | 21.4 | OUT | -1 | G-MOS | 14-Feb | 21.3 | IN | 0 |
| **So** | 16-Jan | 21.9 | IN | 0 | G-RA | 18-Nov | 21.4 | OUT | -1 | EB | 14-Feb | 21.3 | IN | -1 |
| **So** | 02-Jan | 19.9 | IN | 0 | G-SIN | 18-Nov | 21.4 | OUT | -1 | DE | 14-Feb | 21.3 | IN | 0 |
| **So** | 03-Jan | 19.8 | IN | 0 | G-MOS | 18-Nov | 21.4 | OUT | -2 | EB | 15-Feb | 21.9 | IN | 0 |
| **So** | 04-Jan | 19.9 | IN | 0 | AB | 18-Nov | 21.4 | OUT | -1 | AL | 15-Feb | 21.9 | IN | 0 |
| **So** | 05-Jan | 20.9 | IN | 0 | E | 18-Nov | 21.4 | OUT | -2 | DE | 15-Feb | 21.9 | IN | 0 |
| **So** | 06-Jan | 19.6 | IN | 0 | G-GH | 18-Nov | 21.9 | OUT | -1 | AB | 15-Feb | 21.9 | IN | 0 |
| **So** | 07-Jan | 23.7 | IN | 0 | G-RE | 18-Nov | 21.9 | OUT | -1 | G-WA | 16-Feb | 23.5 | IN | 0 |
| **So** | 08-Jan | 21.8 | IN | 0 | DE | 18-Nov | 23 | IN | 0 | EB | 16-Feb | 23.5 | IN | 1 |
| **So** | 09-Jan | 21.4 | IN | 0 | EB | 18-Nov | 23 | IN | 0 | AL | 16-Feb | 23.5 | IN | 0 |
| **So** | 10-Jan | 18.8 | IN | 0 | G-ZAH | 18-Nov | 23 | IN | 0 | DE | 16-Feb | 23.5 | IN | 0 |
| **So** | 11-Jan | 21.8 | IN | 0 | EN | 18-Nov | 23 | IN | 1 | AB | 16-Feb | 23.5 | IN | 0 |
| **So** | 12-Jan | 21.2 | IN | 0 | AB | 18-Nov | 23 | IN | 0 | G-NA | 17-Feb | 21.8 | IN | 0 |
| **So** | 13-Jan | 22.4 | IN | 0 | AL | 18-Nov | 23 | IN | 1 | G-AL | 17-Feb | 21.8 | IN | 0 |
| **So** | 17-Jan | 22.3 | IN | 0 | DE | 19-Nov | 22.4 | IN | 0 | EB | 17-Feb | 21.8 | IN | 0 |
| **So** | 18-Jan | 20.2 | IN | 0 | EN | 19-Nov | 23 | IN | 0 | AL | 17-Feb | 21.8 | IN | 0 |
| **So** | 20-Dec | 20.6 | IN | 0 | G-ZAH | 19-Nov | 23 | IN | 0 | AB | 17-Feb | 21.8 | IN | 0 |
| **So** | 21-Dec | 21.2 | IN | 0 | EB | 19-Nov | 23 | IN | 0 | G-NA | 17-Feb | 15.8 | OUT | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **So** | 22-Dec | 21.7 | IN | 0 | AB | 19-Nov | 23 | IN | 0 | G-AL | 17-Feb | 15.8 | OUT | 0 |
| **So** | 23-Dec | 20.4 | IN | 0 | AL | 19-Nov | 23 | IN | 0 | AL | 17-Feb | 15.8 | OUT | 0 |
| **So** | 24-Dec | 21.7 | IN | 0 | DE | 19-Nov | 23 | IN | 0 | DE | 17-Feb | 15.8 | OUT | -1 |
| **So** | 25-Dec | 19.5 | IN | 0 | DE | 20-Nov | 22.4 | IN | 0 | AB | 17-Feb | 15.8 | OUT | 0 |
| **So** | 26-Dec | 20.3 | IN | 0 | EB | 20-Nov | 22.4 | IN | 0 | DE | 18-Feb | 21.5 | IN | 0 |
| **So** | 26-Dec | 19.4 | IN | -1 | AL | 20-Nov | 23.3 | IN | 0 | EB | 18-Feb | 21.5 | IN | 0 |
| **So** | 27-Dec | 21.7 | IN | 0 | EN | 20-Nov | 23.3 | IN | -1 | AL | 18-Feb | 21.5 | IN | 0 |
| **So** | 28-Dec | 20.3 | IN | 0 | EB | 20-Nov | 23.3 | IN | 0 | AB | 18-Feb | 21.5 | IN | 0 |
| **So** | 29-Dec | 24.3 | IN | 1 | G-ZAH | 20-Nov | 23.3 | IN | -1 | DE | 18-Feb | 16.9 | OUT | 0 |
| **So** | 29-Dec | 20.4 | IN | 0 | g-wa | 20-Nov | 23.3 | IN | 0 | EB | 18-Feb | 16.9 | OUT | -3 |
| **So** | 30-Dec | 20.1 | IN | 0 | al | 20-Nov | 23.3 | IN | 0 | EB | 19-Feb | 22.6 | IN | 0 |
| **So** | 31-Dec | 19.2 | IN | -1 | eb | 20-Nov | 23.3 | IN | -1 | AL | 19-Feb | 22.6 | IN | 0 |
| **So** | 01-Jan | 17.7 | IN | -1 | g-gh | 20-Nov | 23.3 | IN | -1 | DE | 19-Feb | 22.6 | IN | 0 |
| **So** | 02-Jan | 19.9 | IN | -1 | ab | 20-Nov | 23.3 | IN | 0 | AB | 19-Feb | 22.6 | IN | 0 |
| **So** | 03-Jan | 19.1 | IN | -1 | en | 20-Nov | 23.3 | IN | 0 | G-GH | 19-Feb | 22.6 | IN | 0 |
| **So** | 04-Jan | 19.5 | IN | -1 | de | 20-Nov | 23.3 | IN | 0 | G-RE | 19-Feb | 22.5 | IN | 0 |
| **So** | 05-Jan | 29.3 | IN | 0 | en | 21-Nov | 22.8 | IN | 0 | G-SIN | 19-Feb | 22.5 | IN | 0 |
| **So** | 06-Jan | 18.9 | IN | 1 | ab | 21-Nov | 22.8 | IN | 1 | G-GH | 19-Feb | 13.8 | OUT | -2 |
| **So** | 07-Jan | 20.7 | IN | 1 | eb | 21-Nov | 22.8 | IN | 0 | G-SIN | 19-Feb | 13.8 | OUT | 0 |
| **So** | 08-Jan | 24.6 | IN | 0 | de | 21-Nov | 22.8 | IN | 0 | G-RE | 19-Feb | 13.8 | OUT | -1 |
| **So** | 09-Jan | 20 | IN | 1 | al | 21-Nov | 22.8 | IN | 0 | AL | 19-Feb | 13.8 | OUT | 0 |
| **So** | 10-Jan | 22.2 | IN | 0 | G-RE | 21-Nov | 22.8 | IN | 0 | DE | 19-Feb | 13.8 | OUT | 0 |
| **So** | 11-Jan | 22.3 | IN | 0 | G-SIN | 21-Nov | 22.8 | IN | 0 | AB | 19-Feb | 13.8 | OUT | -2 |
| **So** | 12-Jan | 23.1 | IN | 0 | G-GH | 21-Nov | 22.8 | IN | 0 | DE | 24-Feb | 22.1 | IN | 0 |
| **So** | 13-Jan | 24.2 | IN | 0 | DE | 22-Nov | 23 | IN | 0 | EB | 24-Feb | 22.1 | IN | 0 |
| **So** | 14-Jan | 22.1 | IN | 0 | EN | 22-Nov | 23 | IN | -1 | AB | 24-Feb | 22.1 | IN | 0 |
| **So** | 15-Jan | 18.9 | IN | 1 | EB | 22-Nov | 23 | IN | -2 | G-WA | 25-Feb | 21.4 | IN | -1 |
| **So** | 06-Jan | 20.5 | IN | -1 | DE | 22-Nov | 22.4 | IN | 0 | EB | 25-Feb | 21.4 | IN | -1 |
| **So** | 17-Jan | 24.9 | IN | 1 | G-WA | 22-Nov | 25.4 | IN | 0 | AB | 25-Feb | 21.4 | IN | 0 |
| **So** | 18-Jan | 21.2 | IN | 0 | G-AR2 | 22-Nov | 25.4 | IN | 2 | DE | 25-Feb | 21.4 | IN | 0 |
| **So** | 19-Jan | 20.2 | IN | -1 | EN | 22-Nov | 25.4 | IN | 3 | G-WA | 26-Feb | 22.4 | IN | 0 |
| **So** | 20-Jan | 23 | IN | 0 | G-GH | 22-Nov | 25.4 | IN | 0 | EB | 26-Feb | 22.4 | IN | 0 |
| **So** | 21-Jan | 23.9 | IN | 1 | G-DU | 22-Nov | 25.4 | IN | 3 | DE | 26-Feb | 22.4 | IN | 0 |
| **So** | 22-Jan | 23.3 | IN | 0 | EB | 22-Nov | 25.4 | IN | 0 | AB | 26-Feb | 22.4 | IN | 0 |
| **So** | 23-Jan | 22.1 | IN | 0 | G-MOS | 22-Nov | 25.4 | IN | 3 | G-WA | 27-Feb | 20.6 | IN | -1 |
| **So** | 24-Jan | 21.9 | IN | 0 | G-ZAH | 22-Nov | 25.4 | IN | 1 | EB | 27-Feb | 20.6 | IN | 0 |
| **ZA** | 22-Oct | 25.2 | IN | -1 | AB | 22-Nov | 25.4 | IN | 1 | AB | 27-Feb | 20.8 | IN | 0 |
| **MJ** | 22-Oct | 25.2 | IN | 0 | DE | 22-Nov | 25.4 | IN | 2 | DE | 27-Feb | 20.8 | IN | 0 |
| **ZA** | 24-Oct | 26.8 | IN | 1 | G-RU | 22-Nov | 18.6 | OUT | -2 | AL | 27-Feb | 22.7 | IN | 0 |
| **MJ** | 24-Oct | 26.8 | IN | 1 | G-AB | 22-Nov | 18.6 | OUT | -2 | G-SIN | 27-Feb | 22.3 | IN | 0 |
| **ZA** | 26-0 | 27.7 | IN | 2 | G-MOS | 22-Nov | 18.6 | OUT | -2 | G-RE | 27-Feb | 22.3 | IN | 0 |
| **ZA** | 28-Oct | 27.5 | IN | 0 | AL | 22-Nov | 18.6 | OUT | -2 | EB | 27-Feb | 22.3 | IN | 0 |
| **MJ** | 28-Oct | 27.5 | IN | 0 | G-WA | 22-Nov | 18.6 | OUT | 0 | G-WA | 27-Feb | 22.3 | IN | 0 |
| **ZA** | 04-Nov | 26.2 | IN | 1 | DE | 22-Nov | 18.6 | OUT | -2 | DE | 28-Feb | 20.6 | IN | 0 |
| **MJ** | 04-Nov | 26.2 | IN | 2 | AB | 22-Nov | 18.6 | OUT | -2 | EB | 28-Feb | 20.6 | IN | -1 |
| **ZA** | 08-Nov | 2.6 | IN | 0 | DE | 23-Nov | 20.9 | IN | 0 | AB | 28-Feb | 20.6 | IN | 0 |
| **MJ** | 08-Nov | 29.6 | IN | 0 | EB | 23-Nov | 20.9 | IN | 0 | G-WA | 28-Feb | 20.6 | IN | 0 |
| **ZA** | 09-Nov | 26.1 | IN | 0 | EB | 24-Nov | 23.6 | IN | 0 | G-OT | 28-Feb | 21.8 | IN | 1 |
| **MJ** | 09-Nov | 26.1 | IN | 0 | DE | 24-Nov | 23.6 | IN | 0 | G-ZA2 | 28-Feb | 21.8 | IN | 0 |
| **ZA** | 14-Nov | 24.6 | IN | -1 | AL | 24-Nov | 23.6 | IN | 0 | AL | 28-Feb | 21.8 | IN | 0 |
| **MJ** | 11-Nov | 24.6 | IN | 0 | G-RA | 24-Nov | 21.4 | IN | 0 | G-RA | 01-Mar | 22.7 | IN | 0 |
| **ZA** | 17-Nov | 23.9 | IN | 0 | G-AE | 24-Nov | 21.4 | IN | -1 | EB | 01-Mar | 22.7 | IN | 0 |
| **MJ** | 17-Nov | 23.9 | IN | -1 | G-GH | 24-Nov | 21.4 | IN | 0 | AL | 01-Mar | 22.7 | IN | 0 |
| **ZA** | 17-Nov | 24.9 | IN | 1 | G-SIN | 24-Nov | 21.4 | IN | -1 | DE | 01-Mar | 22.7 | IN | 0 |
| **MJ** | 17-Nov | 24.9 | IN | 1 | G-BA | 24-Nov | 21.4 | IN | -2 | AB | 01-Mar | 22.7 | IN | 0 |
| **ZA** | 30-Nov | 22.3 | IN | 0 | de | 24-Nov | 21.4 | IN | 0 | G-WA | 05-Mar | 23.3 | IN | 1 |
| **MJ** | 30-Nov | 22.3 | IN | 1 | AL | 24-Nov | 21.4 | IN | 0 | G-GH | 05-Mar | 23.3 | IN | 0 |
| **ZA** | 10-Dec | 19.1 | IN | 0 | G=RE | 25-Nov | 22 | OUT | -3 | EB | 05-Mar | 23.3 | IN | 0 |
| **MJ** | 10-Dec | 19.1 | IN | 0 | G-SIN | 25-Nov | 22 | OUT | -3 | AL | 05-Mar | 23.3 | IN | 0 |
| **ZA** | 10-Dec | 21.7 | IN | -1 | G-MOS | 25-Nov | 22 | OUT | -3 | AB | 05-Mar | 23.3 | IN | 0 |
| **MJ** | 10-Dec | 21.7 | IN | 0 | AL | 25-Nov | 22 | OUT | -2 | DE | 05-Mar | 23.3 | IN | 0 |
| **ZA** | 12-Dec | 20.2 | IN | -1 | DE | 25-Nov | 22 | OUT | -2 | G-WA | 06-Mar | 23.1 | IN | 0 |
| **MJ** | 12-Dec | 20.2 | IN | 0 | EB | 25-Nov | 20.2 | IN | 0 | EB | 06-Mar | 23.1 | IN | 1 |
| **ZA** | 14-Dec | 20.6 | IN | 0 | EN | 25-Nov | 20.2 | IN | -1 | AL | 06-Mar | 23.1 | IN | 0 |
| **MJ** | 14-Dec | 20.6 | IN | 0 | DE | 25-Nov | 20.2 | IN | 0 | DE | 06-Mar | 23.1 | IN | 0 |
| **ZA** | 21-Dec | 22.6 | IN | 0 | AB | 25-Nov | 20.2 | IN | 0 | AB | 06-Mar | 23.1 | IN | 0 |
| **MJ** | 21-Dec | 22.6 | IN | 0 | DE | 27-Nov | 19 | IN | -1 | G-WA | 07-Mar | 22.4 | IN | 0 |
| **ZA** | 30-Apr | 23.7 | IN | -1 | EB | 27-Nov | 19 | IN | 0 | EB | 07-Mar | 22.4 | IN | 0 |
| **MJ** | 23-Dec | 23.7 | IN | 0 | EN | 27-Nov | 20.5 | IN | -1 | AL | 07-Mar | 22.4 | IN | 0 |
| **ZA** | 26-Dec | 23.6 | IN | 0 | AB | 27-Nov | 20.5 | IN | 0 | DE | 07-Mar | 22.4 | IN | 0 |
| **MJ** | 26-Dec | 23.6 | IN | 0 | G-ZAH | 27-Nov | 20.5 | IN | -2 | AB | 07-Mar | 22.4 | IN | 0 |
| **ZA** | 28-Dec | 22.4 | IN | 0 | DE | 27-Nov | 20.5 | IN | 0 | G-NA | 08-Mar | 22.7 | IN | 0 |
| **MJ** | 28-Dec | 22.4 | IN | 0 | AL | 27-Nov | 20.5 | IN | 0 | G-AL | 08-Mar | 22.7 | IN | 0 |
| **ZA** | 22-Jan | 21.7 | IN | -1 | AB | 27-Nov | 20.5 | IN | -2 | EB | 08-Mar | 22.7 | IN | 0 |
| **MJ** | 22-Jan | 21.7 | IN | 0 | G-SIN | 27-Nov | 19.9 | IN | 0 | YA | 08-Mar | 22.9 | IN | 0 |
| **LM** | 22-Jan | 21.7 | IN | -1 | G-GH | 27-Nov | 19.9 | IN | 0 | DE | 08-Mar | 22.9 | IN | 0 |
| **ZA** | 25-Jan | 22.7 | IN | 0 | DE | 28-Nov | 18.4 | IN | -1 | AB | 08-Mar | 22.9 | IN | 0 |
| **MG** | 25-Jan | 22.7 | IN | 0 | EB | 28-Nov | 18.4 | IN | -2 | G-NA | 08-Mar | 19.1 | OUT | 0 |
| **LM** | 25-Jan | 22.7 | IN | 0 | G-GH | 28-Nov | 21.1 | IN | 0 | G-AL | 08-Mar | 19.1 | OUT | 0 |
| **ZA** | 26-Jan | 24.6 | IN | 1 | G-ZAH | 28-Nov | 21.1 | IN | 0 | YA | 08-Mar | 19.1 | OUT | 0 |
| **MG** | 26-Jan | 24.6 | IN | 1 | AB | 28-Nov | 21.1 | IN | 0 | AL | 08-Mar | 19.1 | OUT | 0 |
| **LM** | 26-Jan | 24.6 | IN | 0 | EB | 28-Nov | 21.1 | IN | 1 | DE | 08-Mar | 19.1 | OUT | 0 |
| **ZA** | 27-Jan | 22.4 | IN | 0 | DE | 28-Nov | 21.1 | IN | 0 | AB | 08-Mar | 19.1 | OUT | 0 |
| **MJ** | 27-Sep | 22.4 | IN | 1 | EN | 28-Nov | 21.1 | IN | 0 | EB | 08-Mar | 19.1 | OUT | 0 |
| **LM** | 27-Sep | 22.4 | IN | 0 | DE | 28-Nov | 21.4 | IN | 0 | YA | 09-Mar | 21.9 | IN | 0 |
| **ZA** | 28-Jan | 21.7 | IN | -1 | G-RE | 30-Nov | 20.2 | OUT | -3 | EB | 09-Mar | 21.9 | IN | 0 |
| **MJ** | 28-Jan | 21.7 | IN | 0 | G-RA | 30-Nov | 20.2 | OUT | -2 | DE | 09-Mar | 21.9 | IN | 0 |
| **LM** | 28-Jan | 21.7 | IN | -1 | G-AB | 30-Nov | 20.2 | OUT | -3 | AB | 09-Mar | 21.9 | IN | 0 |
| **ZA** | 29-Jan | 22.2 | IN | -1 | G-MOS2 | 30-Nov | 20.2 | OUT | -2 | G-MOS | 09-Mar | 22.4 | IN | 2 |
| **MJ** | 29-Jan | 22.2 | IN | 0 | AL | 30-Nov | 20.2 | OUT | -1 | G-RU | 09-Mar | 22.4 | IN | 3 |
| **LM** | 29-Jan | 22.2 | IN | -1 | DE | 30-Nov | 20.2 | OUT | -1 | AB | 09-Mar | 22.4 | IN | 3 |
| **ZA** | 12-Jan | 17.7 | IN | -2 | G-SIN | 30-Nov | 20.2 | OUT | -3 | DE | 09-Mar | 22.4 | IN | 1 |
| **AA** | 12-Jan | 18.6 | IN | 0 | EN | 30-Nov | 21.7 | IN | 0 | YA | 09-Mar | 22.4 | IN | 2 |
| **BA** | 12-Jan | 18.6 | IN | -1 | EB | 30-Nov | 21.7 | IN | 0 | AL | 10-Mar | 23.4 | IN | 0 |
| **HA** | 12-Jan | 18.6 | IN | -1 | G-ZAH | 30-Nov | 21.7 | IN | 0 | G-RA | 10-Mar | 23.4 | IN | 0 |
| **DW** | 12-Jan | 18.6 | IN | -2 | AB | 30-Nov | 21.7 | IN | 0 | AB | 10-Mar | 23.4 | IN | 0 |
| **AA** | 12-Feb | 23 | IN | -1 | DE | 30-Nov | 21.7 | IN | 0 | EB | 10-Mar | 23.4 | IN | 0 |
| **MJ** | 12-Feb | 23 | IN | 0 | G-RU | 30-Nov | 21.8 | IN | 0 | DE | 10-Mar | 23.4 | IN | 0 |
| **QW** | 12-Feb | 23 | IN | 0 | G-MOS | 30-Nov | 21.8 | IN | 0 | YA | 10-Mar | 23.4 | IN | 0 |
| **HA** | 12-Feb | 23 | IN | 0 | G-RE | 30-Nov | 21.2 | IN | -1 | DE | 12-Mar | 22.3 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ZA** | 12-Feb | 23 | IN | 0 | G-ALA | 30-Nov | 21.2 | IN | 0 | EB | 12-Mar | 22.3 | IN | 0 |
| **BA** | 12-Feb | 23 | IN | -1 | G-SIN | 30-Nov | 21.2 | IN | 0 | AL | 12-Mar | 22.3 | IN | 0 |
| **OA** | 12-Feb | 23 | IN | -1 | G-GH | 30-Nov | 21.2 | IN | 0 | YA | 12-Mar | 22.3 | IN | 0 |
| **ZA** | 02-Mar | 25.3 | IN | -1 | G-NA | 30-Nov | 21.2 | IN | 0 | AB | 12-Mar | 22.3 | IN | 0 |
| **MJ** | 02-Mar | 25.3 | IN | 0 | G-AH | 30-Nov | 21.6 | IN | 0 | G-GH | 12-Mar | 22.7 | IN | 1 |
| **AA** | 02-Mar | 25.3 | IN | 0 | G-RA | 30-Nov | 21.6 | IN | 0 | EB | 12-Mar | 22.7 | IN | -1 |
| **QW** | 02-Mar | 25.3 | IN | -1 | AL | 30-Nov | 21.6 | IN | 0 | DE | 12-Mar | 22.7 | IN | 0 |
| **HA** | 02-Mar | 25.3 | IN | -1 | EB | 30-Nov | 21.6 | IN | -1 | AB | 12-Mar | 22.7 | IN | -1 |
| **BA** | 02-Mar | 25.3 | IN | -1 | G-NA | 01-Dec | 22.9 | OUT | -2 | AL | 12-Mar | 22.7 | IN | 0 |
| **DW** | 02-Mar | 25.3 | IN | 0 | G-ALA | 01-Dec | 22.9 | OUT | 0 | DE | 13-Mar | 22.6 | IN | 0 |
| **Ob** | 03-May | 26.3 | In | 0 | AL | 01-Dec | 22.9 | OUT | -1 | EB | 13-Mar | 22.6 | IN | 0 |
| **Ob** | 04-May | 25.6 | OUT | 0 | DE | 01-Dec | 22.9 | OUT | -1 | AB | 13-Mar | 22.6 | IN | 0 |
| **XY** | 10-May | 26.7 | In | 0 | G-SIN | 01-Dec | 22.9 | OUT | 0 | GRE | 15-Mar | 23.2 | IN | 0 |
| **V** | 11-May | 29.9 | OUT | 1 | G-RE | 01-Dec | 21.3 | OUT | -3 | G-RA | 15-Mar | 23.2 | IN | 0 |
| **XY** | 12-May | 23.1 | OUT | 1 | G-GH | 01-Dec | 21.3 | OUT | -3 | DE | 15-Mar | 23.2 | IN | 0 |
| **ob** | 13-May | 31.1 | OUT | 1 | G-RA | 01-Dec | 21.3 | OUT | -3 | EB | 15-Mar | 23.2 | IN | 0 |
| **ZY** | 14-May | 25.6 | In | 0 | AB | 01-Dec | 21.3 | OUT | 0 | YA | 15-Mar | 23.2 | IN | 0 |
| **ob** | 18-May | 25.3 | In | -1 | DE | 01-Dec | 22.1 | IN | 0 | G-MOS2 | 16-Mar | 23 | IN | 0 |
| **ob** | 18-May | 25.2 | In | 1 | EN | 01-Dec | 22.1 | IN | 1 | G-AB | 16-Mar | 23 | IN | 2 |
| **V** | 19-May | 24.5 | OUT | 0 | AL | 01-Dec | 22.1 | IN | 0 | AB | 16-Mar | 23 | IN | 2 |
| **ob** | 01-May | 25.3 | In | 0 | EB | 01-Dec | 22.1 | IN | 0 | G-SIN | 16-Mar | 22.9 | IN | 0 |
| **ZY** | 19-May | 26.3 | In | 0 | AB | 01-Dec | 22.1 | IN | 1 | AL | 16-Mar | 22.9 | IN | 0 |
| **ZY** | 20-May | 54.1 | OUT | 2 | G-ZAH | 01-Dec | 22.1 | IN | 0 | G-SIN | 16-Mar | 20.4 | OUT | 0 |
| **XY** | 23-May | 27.6 | In | 2 | G-SIN | 01-Dec | 21.7 | IN | 0 | G-RE | 16-Mar | 20.4 | OUT | 0 |
| **ob** | 24-May | 27.3 | In | 2 | G-MA | 01-Dec | 21.7 | IN | 0 | G-RA | 16-Mar | 20.4 | OUT | 0 |
| **XY** | 25-May | 27.2 | In | -1 | G-RE | 01-Dec | 21.7 | IN | 0 | G-MOS2 | 16-Mar | 20.4 | OUT | 1 |
| **ob** | 26-May | 28.7 | In | 0 | G-GH | 01-Dec | 21.7 | IN | 0 | G-AB | 16-Mar | 20.4 | OUT | 0 |
| **ZY** | 27-May | 28.7 | In | 0 | AL | 01-Dec | 21.7 | IN | 0 | YA | 16-Mar | 20.4 | OUT | 0 |
| **V** | 28-May | 27.9 | In | 0 | EN | 01-Dec | 21.7 | IN | 0 | AL | 16-Mar | 20.4 | OUT | 0 |
| **EB** | 16-Oct | 27.3 | IN | 1 | AB | 01-Dec | 21.7 | IN | 0 | DE | 16-Mar | 20.4 | OUT | 0 |
| **EB** | 16-Oct | 25.5 | IN | 0 | G-LE | 01-Dec | 21.7 | IN | 0 | AB | 16-Mar | 20.4 | OUT | 0 |
| **AB** | 16-Oct | 26.2 | IN | 0 | G-RA | 01-Dec | 21.7 | IN | 0 | G-MOS | 18-Mar | 22.8 | IN | 0 |
| **EB** | 17-Oct | 25.9 | IN | 0 | DE | 01-Dec | 21.7 | IN | 0 | AL | 18-Mar | 22.5 | IN | 0 |
| **AB** | 17-Oct | 26 | IN | -1 | G-MA | 02-Dec | 21.8 | OUT | -1 | EB | 19-Mar | 22.8 | IN | 0 |
| **DE** | 17-Oct | 26 | IN | 0 | G-GH | 02-Dec | 21.8 | OUT | -1 | DE | 19-Mar | 22.8 | IN | 0 |
| **YA** | 17-Oct | 26.9 | IN | 0 | G-SA | 02-Dec | 21.8 | OUT | -3 | AB | 19-Mar | 22.9 | IN | 0 |
| **EN** | 17-Oct | 27.3 | IN | 0 | G-AB | 02-Dec | 21.8 | OUT | 0 | G-SIN | 19-Mar | 22.9 | IN | 0 |
| **AB** | 17-Oct | 26.5 | IN | -1 | G-MOS2 | 02-Dec | 21.8 | OUT | 0 | G-RE | 19-Mar | 22.9 | IN | 0 |
| **EB** | 17-Oct | 26.3 | IN | 0 | AB | 02-Dec | 21.8 | OUT | 0 | D-GH | 19-Mar | 22.9 | IN | 0 |
| **EB** | 17-Oct | 28.5 | IN | 1 | DE | 02-Dec | 21.8 | OUT | 0 | AL | 19-Mar | 22.9 | IN | 0 |
| **AL** | 17-Oct | 31 | IN | 0 | G-MOS2 | 02-Dec | 21.7 | IN | 0 | YA | 19-Mar | 22.9 | IN | 0 |
| **AB** | 17-Oct | 29 | IN | 0 | G-AB | 02-Dec | 21.7 | IN | 0 | G-SIN | 20-Mar | 17.2 | OUT | -1 |
| **RE** | 17-Oct | 30.4 | IN | 0 | G-SIN | 02-Dec | 21.3 | OUT | 0 | G-RE | 20-Mar | 17.2 | OUT | 0 |
| **YA** | 17-Oct | 30.3 | IN | 0 | G-RA | 02-Dec | 21.3 | OUT | -3 | G-GH | 20-Mar | 17.2 | OUT | -1 |
| **SIN** | 17-Oct | 27.8 | IN | 0 | G-RE | 02-Dec | 21.3 | OUT | -1 | DE | 20-Mar | 17.2 | OUT | -1 |
| **AB** | 17-Oct | 27.7 | IN | 0 | AL | 02-Dec | 21.3 | OUT | 0 | AL | 20-Mar | 17.2 | OUT | 0 |
| **EB** | 17-Oct | 27.7 | IN | 0 | G-MOS | 02-Dec | 22.3 | IN | 0 | YA | 20-Mar | 17.2 | OUT | -1 |
| **DE** | 17-Oct | 27.6 | IN | 0 | G-RU | 02-Dec | 22.3 | IN | 0 | AB | 20-Mar | 17.2 | OUT | 0 |
| **AB** | 18-Oct | 28 | IN | 1 | G-ZAH | 02-Dec | 22.3 | IN | 0 | EB | 23-Mar | 24.7 | IN | 0 |
| **EB** | 18-Oct | 28.3 | IN | 1 | G-WA | 02-Dec | 22.3 | IN | 0 | AL | 23-Mar | 24.7 | IN | 0 |
| **DE** | 18-Oct | 28.5 | IN | 0 | EN | 02-Dec | 22.3 | IN | 0 | YA | 23-Mar | 24.7 | IN | 0 |
| **AB** | 18-Oct | 26.7 | IN | 1 | DE | 02-Dec | 22.3 | IN | 0 | DE | 23-Mar | 24.7 | IN | 0 |
| **EN** | 18-Oct | 26.4 | IN | 0 | G-SIN | 02-Dec | 20.9 | IN | 0 | AB | 23-Mar | 24.7 | IN | 0 |
| **SIN** | 18-Oct | 26.4 | IN | 0 | G-DE | 02-Dec | 20.9 | IN | 0 | EB | 24-Mar | 25.1 | IN | 0 |
| **GR** | 18-Oct | 26.6 | IN | 0 | G-GH | 02-Dec | 20.9 | IN | 0 | AL | 24-Mar | 25.1 | IN | 0 |
| **YA** | 18-Oct | 26.5 | IN | 0 | G-WA | 02-Dec | 20.9 | IN | 0 | DE | 24-Mar | 25.1 | IN | 0 |
| **EN** | 18-Oct | 26.7 | IN | 0 | AL | 02-Dec | 20.9 | IN | -1 | AB | 24-Mar | 25.1 | IN | 0 |
| **YA** | 18-Oct | 26.6 | IN | 0 | DE | 03-Dec | 19.2 | IN | 0 | G-WA | 25-Mar | 24.4 | IN | 0 |
| **EB** | 18-Oct | 26.7 | IN | 0 | EB | 03-Dec | 19.2 | IN | -1 | G-ZAH | 25-Mar | 24.4 | IN | -1 |
| **AB** | 19-Oct | 26.6 | IN | 0 | AL | 03-Dec | 20.7 | IN | 0 | EB | 25-Mar | 24.4 | IN | 0 |
| **EB** | 19-Oct | 26.4 | IN | 0 | EN | 03-Dec | 20.7 | IN | 0 | DE | 25-Mar | 24.4 | IN | 0 |
| **EN** | 20-Oct | 26.4 | IN | 0 | G-WA | 03-Dec | 23.7 | IN | 0 | G-MOS | 25-Mar | 25.2 | IN | 1 |
| **DE** | 20-Oct | 26.1 | IN | 0 | DE | 03-Dec | 23.7 | IN | 0 | G-RU | 25-Mar | 25.2 | IN | 0 |
| **YA** | 20-Oct | 23.7 | OUT | -1 | AB | 03-Dec | 23.7 | IN | 0 | AL | 26-Mar | 24.3 | IN | 0 |
| **AL** | 20-Oct | 22.8 | OUT | -1 | EB | 03-Dec | 23.7 | IN | 0 | YA | 26-Mar | 24.3 | IN | 0 |
| **AB** | 20-Oct | 25.8 | IN | 0 | G-GH | 03-Dec | 20.1 | IN | -1 | EB | 26-Mar | 24.6 | IN | 0 |
| **EB** | 20-Oct | 25.9 | IN | 0 | G-SIN | 03-Dec | 20.1 | IN | -1 | DE | 26-Mar | 24.6 | IN | 0 |
| **AB** | 20-Oct | 26 | IN | 1 | EN | 04-Dec | 20.4 | OUT | -1 | G-GH | 26-Mar | 24.9 | IN | 0 |
| **EN** | 20-Oct | 26 | IN | 1 | DE | 04-Dec | 20.4 | OUT | -1 | G-SIN | 26-Mar | 24.9 | IN | 0 |
| **DE** | 20-Jan | 26 | IN | 1 | EB | 04-Dec | 20.4 | OUT | -1 | G-RE | 26-Mar | 24.9 | IN | 0 |
| **EB** | 20-Oct | 26 | IN | 1 | AB | 04-Dec | 20.4 | OUT | 0 | AL | 26-Mar | 24.9 | IN | 0 |
| **G-NA** | 20-Oct | 26.2 | IN | 0 | DE | 05-Dec | 21.3 | IN | 0 | DE | 26-Mar | 24.9 | IN | 0 |
| **G-ALA** | 20-Oct | 26.2 | IN | 0 | AL | 05-Dec | 21.3 | IN | 0 | EB | 26-Mar | 24.9 | IN | 0 |
| **G-OM** | 20-Oct | 26.2 | IN | 0 | EN | 05-Dec | 21.3 | IN | -2 | YA | 26-Mar | 24.9 | IN | 0 |
| **G-WA** | 20-Oct | 26.2 | IN | 0 | AB | 05-Dec | 21.3 | IN | -1 | AB | 26-Mar | 24.9 | IN | 0 |
| **G-RA** | 20-Oct | 26.2 | IN | 0 | EB | 05-Dec | 21.3 | IN | 0 | G-MOS | 27-Mar | 25.1 | IN | 1 |
| **G-GH** | 20-Oct | 26.2 | IN | -1 | DE | 05-Dec | 21.9 | IN | 0 | G-ZAH | 27-Mar | 25.1 | IN | 0 |
| **G-FE** | 20-Oct | 26.2 | IN | 0 | EB | 05-Dec | 21.9 | IN | 0 | EB | 27-Mar | 25.1 | IN | 0 |
| **G-SIN** | 20-Oct | 26.2 | IN | -1 | AB | 05-Dec | 21.9 | IN | 0 | DE | 27-Mar | 25.1 | IN | 0 |
| **RE** | 21-Oct | 22.3 | OUT | 0 | AL | 05-Dec | 21.9 | IN | 0 | EB | 28-Mar | 25.2 | IN | 0 |
| **EN** | 21-Oct | 22.3 | OUT | -1 | DE | 06-Dec | 23.3 | IN | 0 | AL | 28-Mar | 25.2 | IN | 0 |
| **DE** | 21-Oct | 25.4 | IN | 1 | G-ZAH | 06-Dec | 23.3 | IN | 0 | DE | 28-Mar | 25.2 | IN | 0 |
| **EB** | 21-Oct | 25.4 | IN | 1 | AB | 06-Dec | 23.3 | IN | 0 | AB | 28-Mar | 25.2 | IN | -1 |
| **AB** | 21-Oct | 25.4 | IN | 0 | G-MOS | 06-Dec | 21.8 | IN | 0 | EB | 29-Mar | 25.1 | IN | 0 |
| **EN** | 21-Oct | 25.4 | IN | 1 | G-DH | 06-Dec | 21.8 | IN | 0 | AL | 29-Mar | 25.1 | IN | 0 |
| **DE** | 21-Oct | 25.4 | IN | 0 | G-ZE | 06-Dec | 21.8 | IN | 2 | YA | 29-Mar | 25.1 | IN | 0 |
| **AB** | 21-Oct | 25.8 | IN | 1 | G-WA | 06-Dec | 21.8 | IN | 0 | EB | 29-Mar | 25.3 | IN | 0 |
| **WA** | 21-Oct | 25.8 | IN | 0 | G-QA | 06-Dec | 21.8 | IN | 0 | DE | 29-Mar | 25.3 | IN | 1 |
| **DE** | 21-Oct | 25.8 | IN | 1 | EB | 06-Dec | 21.8 | IN | 0 | AL | 29-Mar | 25.3 | IN | 0 |
| **AB** | 21-Oct | 25.8 | IN | 0 | EN | 06-Dec | 21.8 | IN | 0 | G-GH | 29-Mar | 25.3 | IN | 0 |
| **EN** | 21-Oct | 26.3 | IN | 0 | G-SIN | 06-Dec | 21.4 | IN | 0 | G-SIN | 29-Mar | 25.2 | IN | 1 |
| **AB** | 21-Oct | 26.3 | IN | 0 | G-GH | 06-Dec | 21.4 | IN | -1 | G-RE | 29-Mar | 25.2 | IN | 0 |
| **G-WA** | 21-Oct | 25 | IN | 0 | DE | 07-Dec | 20.1 | IN | 0 | G-RA | 29-Mar | 25.2 | IN | 2 |
| **DE** | 21-Oct | 25 | IN | 1 | EB | 07-Dec | 20.1 | IN | -1 | YA | 29-Mar | 25.2 | IN | 0 |
| **EN** | 21-Oct | 25.7 | IN | 0 | EN | 07-Dec | 20.7 | IN | 0 | G-SIN | 30-Mar | 18.2 | OUT | 0 |
| **EB** | 21-Oct | 25.7 | IN | 0 | G-RA | 07-Dec | 20.7 | IN | 0 | G-RE | 30-Mar | 18.2 | OUT | 0 |
| **AB** | 21-Oct | 25.7 | IN | 0 | G-ZAH | 07-Dec | 20.7 | IN | -2 | G-RA | 30-Mar | 18.2 | OUT | 0 |
| **G-WA** | 21-Oct | 25.7 | IN | 0 | AL | 07-Dec | 20.7 | IN | 0 | AL | 30-Mar | 18.2 | OUT | 0 |
| **AB** | 21-Oct | 25.7 | IN | 0 | EB | 07-Dec | 20.7 | IN | 0 | DE | 30-Mar | 18.2 | OUT | 0 |
| **EN** | 21-Oct | 25.9 | IN | 1 | G-SIN | 23-Dec | 16.4 | OUT | 0 | G-NA | 30-Mar | 25 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DE** | 21-Oct | 25.9 | IN | 1 | G-RA | 23-Dec | 16.4 | OUT | 0 | G-ALA | 30-Mar | 25 | IN | 0 |
| **AL** | 21-Oct | 25.9 | IN | 0 | G-AB | 23-Dec | 16.4 | OUT | 0 | EB | 30-Mar | 25 | IN | 0 |
| **AB** | 21-Oct | 26.9 | IN | 0 | G-RE | 23-Dec | 16.4 | OUT | 0 | AL | 30-Mar | 25 | IN | 0 |
| **EB** | 22-Oct | 26.9 | IN | 0 | G-GH | 23-Dec | 16.4 | OUT | 0 | DE | 30-Mar | 25 | IN | 0 |
| **EN** | 22-Oct | 26.9 | IN | 0 | AL | 23-Dec | 16.4 | OUT | 0 | G-NA | 31-Mar | 16 | OUT | 0 |
| **DE** | 22-Oct | 24.4 | IN | 0 | G-SIN | 23-Dec | 22.6 | IN | 0 | G-ALA | 31-Mar | 16 | OUT | 0 |
| **AB** | 22-Oct | 26 | IN | 1 | G-RE | 23-Dec | 22.6 | IN | 0 | AL | 31-Mar | 16 | OUT | 0 |
| **EB** | 22-Oct | 26.1 | IN | 1 | G-MA | 23-Dec | 22.6 | IN | 2 | DE | 31-Mar | 16 | OUT | 1 |
| **DE** | 22-Oct | 25.8 | IN | 0 | G-TA | 23-Dec | 22.6 | IN | 0 | YA | 31-Mar | 16 | OUT | 0 |
| **AB** | 22-Oct | 25.8 | IN | 0 | G-SA | 23-Dec | 22.6 | IN | 2 | EB | 31-Mar | 25.3 | IN | 0 |
| **EN** | 22-Oct | 25.8 | IN | 1 | G-GH | 23-Dec | 22.6 | IN | 0 | AL | 31-Mar | 25.3 | IN | 0 |
| **AB** | 22-Oct | 25.8 | IN | 0 | EB | 23-Dec | 22.6 | IN | 0 | DE | 31-Mar | 25.3 | IN | -1 |
| **DE** | 22-Oct | 24.9 | OUT | 0 | DE | 23-Dec | 22.6 | IN | 0 | AB | 31-Mar | 25.3 | IN | 0 |
| **EB** | 22-Oct | 24.9 | OUT | 0 | DE | 26-Dec | 23.3 | IN | 0 | YA | 31-Mar | 25.3 | IN | 0 |
| **AB** | 22-Oct | 25.7 | OUT | -1 | EB | 26-Dec | 23.3 | IN | 0 | EB | 01-Apr | 24.1 | IN | 0 |
| **AL** | 22-Oct | 25.7 | IN | 0 | G-SIN | 26-Dec | 81.5 | IN | 0 | AL | 01-Apr | 24.1 | IN | 0 |
| **EB** | 22-Oct | 25.7 | IN | 0 | G-RE | 26-Dec | 81.5 | IN | 0 | DE | 01-Apr | 24.1 | IN | 0 |
| **AB** | 23-Oct | 26 | IN | 0 | G-GH | 26-Dec | 81.5 | IN | 0 | AB | 01-Apr | 24.1 | IN | 0 |
| **EB** | 23-Oct | 26 | IN | 0 | DE | 27-Dec | 20.6 | IN | -1 | G-SIN | 07-Apr | 25.8 | IN | 0 |
| **AG** | 23-Oct | 26 | IN | 0 | AL | 27-Dec | 20.6 | IN | 0 | G-RE | 07-Apr | 25.8 | IN | 0 |
| **EB** | 23-Oct | 26 | IN | 0 | EB | 27-Dec | 20.6 | IN | -1 | AL | 07-Apr | 25.8 | IN | 0 |
| **DE** | 23-Oct | 26 | IN | 0 | AB | 27-Dec | 20.6 | IN | 0 | EB | 07-Apr | 25.8 | IN | 1 |
| **EN** | 23-Oct | 20.3 | IN | 0 | DE | 28-Dec | 23.9 | IN | 0 | YA | 07-Apr | 25.8 | IN | 0 |
| **AB** | 23-Oct | 20.3 | IN | 0 | AB | 28-Dec | 23.9 | IN | 0 | G-RA | 07-Apr | 26.2 | IN | 0 |
| **DE** | 23-Oct | 26.3 | IN | 1 | AL | 28-Dec | 23.9 | IN | 0 | AL | 07-Apr | 26.2 | IN | 0 |
| **EB** | 23-Oct | 26.3 | IN | 0 | EB | 28-Dec | 23.9 | IN | 0 | EB | 07-Apr | 26.2 | IN | 0 |
| **EN** | 23-Oct | 26.3 | IN | 1 | G-NA | 28-Dec | 23 | IN | 0 | AB | 07-Apr | 26.2 | IN | 0 |
| **G-GH** | 23-Oct | 26.3 | IN | 2 | G-AH | 28-Dec | 23 | IN | 0 | DE | 07-Apr | 26.2 | IN | 1 |
| **DE** | 24-Oct | 25 | IN | 0 | G-NA | 29-Dec | 13.4 | OUT | 0 | G-AB | 07-Apr | 26 | IN | 0 |
| **EB** | 24-Oct | 25 | IN | 0 | G-AH | 29-Dec | 13.4 | OUT | 0 | G-YO | 07-Apr | 26 | IN | 1 |
| **DE** | 24-Oct | 25 | IN | 0 | DE | 29-Dec | 13.4 | OUT | -1 | G-SIN | 09-Apr | 26.9 | IN | 0 |
| **EN** | 24-Oct | 25 | IN | 0 | AL | 29-Dec | 13.4 | OUT | 0 | G-RE | 09-Apr | 26.9 | IN | 0 |
| **DE** | 24-Oct | 27.6 | OUT | 0 | DE | 29-Dec | 22.8 | IN | 0 | EB | 09-Apr | 26.9 | IN | 0 |
| **EN** | 24-Oct | 27.6 | OUT | -1 | AL | 29-Dec | 22.8 | IN | 0 | AL | 09-Apr | 26.9 | IN | 2 |
| **EB** | 24-Oct | 27.6 | OUT | -2 | AB | 29-Dec | 22.8 | IN | 0 | DE | 09-Apr | 26.9 | IN | 1 |
| **DE** | 25-Oct | 24.2 | IN | 0 | EB | 29-Dec | 22.8 | IN | 0 | G-NA | 13-Apr | 24.8 | IN | 0 |
| **AB** | 25-Oct | 24.2 | IN | 0 | G-ZAH | 29-Dec | 22.8 | IN | 0 | G-ALA | 13-Apr | 24.8 | IN | 0 |
| **G-AR** | 25-Oct | 26 | OUT | 0 | G-SIN | 29-Dec | 23.9 | IN | 0 | G-SIN | 13-Apr | 24.8 | IN | 0 |
| **DE** | 25-Oct | 26 | OUT | 0 | G-RE | 29-Dec | 23.9 | IN | 0 | G-RE | 13-Apr | 24.8 | IN | 0 |
| **G-GH** | 25-Oct | 26.2 | IN | 0 | G-GH | 29-Dec | 23.9 | IN | 0 | G-RA | 13-Apr | 24.8 | IN | 2 |
| **AL** | 25-Oct | 26.2 | IN | 1 | G-RA | 29-Dec | 23.9 | IN | 2 | G-GH | 13-Apr | 24.8 | IN | 0 |
| **EB** | 25-Oct | 26.2 | IN | 0 | G-MOS2 | 29-Dec | 23.9 | IN | 2 | YA | 13-Apr | 24.8 | IN | 0 |
| **EN** | 25-Oct | 26.2 | IN | 0 | G-AB | 29-Dec | 23.9 | IN | 2 | EB | 13-Apr | 24.8 | IN | 0 |
| **AB** | 28-Oct | 31.8 | IN | 0 | G-SIN | 30-Dec | 15.6 | OUT | 0 | DE | 13-Apr | 24.8 | IN | 0 |
| **EB** | 28-Oct | 31.8 | IN | 1 | G-RE | 30-Dec | 15.6 | OUT | -1 | AL | 13-Apr | 24.8 | IN | 0 |
| **EN** | 28-Oct | 28 | OUT | 1 | G-GH | 30-Dec | 15.6 | OUT | -1 | G-NA | 13-Apr | 24.8 | IN | 0 |
| **DE** | 28-Oct | 28 | OUT | 1 | G-RA | 30-Dec | 15.6 | OUT | 0 | G-AL | 14-Apr | 17.3 | OUT | 0 |
| **DE** | 28-Oct | 28 | IN | 2 | G-AB | 30-Dec | 15.6 | OUT | 0 | G-SIN | 14-Apr | 17.3 | OUT | -1 |
| **AB** | 28-Oct | 28 | IN | 0 | DE | 30-Dec | 15.6 | OUT | 0 | AB | 14-Apr | 17.3 | OUT | 0 |
| **EN** | 28-Oct | 27 | IN | 1 | AL | 30-Dec | 15.6 | OUT | 0 | G-RA | 14-Apr | 17.3 | OUT | 0 |
| **AB** | 28-Oct | 27 | IN | 1 | DE | 30-Dec | 22.2 | IN | 0 | G-GH | 14-Apr | 17.3 | OUT | -2 |
| **AL** | 28-Oct | 27 | IN | 1 | EB | 30-Dec | 22.2 | IN | 0 | G-RE | 14-Apr | 18 | OUT | 0 |
| **G-GH** | 28-Oct | 27 | IN | 0 | AB | 30-Dec | 22.2 | IN | 0 | G-MOS2 | 14-Apr | 18 | OUT | 0 |
| **DE** | 28-Oct | 27 | IN | 0 | AL | 30-Dec | 22.2 | IN | 0 | G-WA | 18-Apr | 24.6 | IN | 1 |
| **AB** | 28-Oct | 27 | IN | 0 | G-SIN | 30-Dec | 21.9 | IN | 0 | YA | 18-Apr | 24.6 | IN | 0 |
| **DE** | 29-Oct | 26.6 | IN | 0 | G-RE | 30-Dec | 21.9 | IN | 0 | AB | 18-Apr | 24.6 | IN | 0 |
| **AL** | 29-Oct | 26.6 | IN | 0 | G-GH | 30-Dec | 21.9 | IN | 0 | DE | 18-Apr | 24.6 | IN | 1 |
| **EB** | 29-Oct | 26.6 | IN | -1 | G-RA | 30-Dec | 21.9 | IN | 0 | G-GH | 19-Apr | 25.8 | IN | 2 |
| **AB** | 29-Oct | 26.6 | IN | 0 | G-SIN | 31-Dec | 15.4 | OUT | -2 | EB | 19-Apr | 25.8 | IN | 0 |
| **DE** | 29-Oct | 26.6 | IN | 0 | G-RE | 31-Dec | 15.4 | OUT | -3 | AL | 19-Apr | 25.8 | IN | 0 |
| **EN** | 29-Oct | 26.7 | IN | 2 | G-RA | 31-Dec | 15.4 | OUT | -1 | AB | 19-Apr | 25.8 | IN | 0 |
| **EB** | 29-Oct | 26.7 | IN | 1 | G-GH | 31-Dec | 15.4 | OUT | -1 | DE | 19-Apr | 25.8 | IN | 1 |
| **G-GH** | 29-Oct | 26.9 | IN | 1 | G-AB | 31-Dec | 15.4 | OUT | 0 | EB | 20-Apr | 26.1 | IN | 0 |
| **G-SIN** | 29-Oct | 26.9 | IN | 1 | AL | 31-Dec | 15.4 | OUT | 0 | AB | 20-Apr | 26.1 | IN | 1 |
| **DE** | 29-Oct | 26.9 | IN | 0 | DE | 31-Dec | 15.4 | OUT | 0 | DE | 20-Apr | 26.1 | IN | 1 |
| **AL** | 29-Oct | 26.9 | IN | 1 | EB | 31-Dec | 21.6 | IN | 0 | EB | 21-Apr | 26.1 | IN | -1 |
| **EN** | 29-Oct | 26.9 | IN | 2 | DE | 31-Dec | 21.6 | IN | 0 | AL | 21-Apr | 26.1 | IN | 0 |
| **EB** | 29-Oct | 26.9 | IN | 2 | AB | 31-Dec | 21.6 | IN | 0 | DE | 21-Apr | 26.1 | IN | 1 |
| **DE** | 30-Oct | 26.4 | IN | 0 | AL | 31-Dec | 21.6 | IN | 0 | AB | 21-Apr | 26.1 | IN | 0 |
| **EN** | 30-Oct | 26.4 | IN | 1 | G-ZAH | 31-Dec | 21.6 | IN | 0 | EB | 23-Apr | 24.2 | IN | 0 |
| **DE** | 30-Oct | 26.4 | IN | 0 | DE | 01-Jan | 20.8 | IN | 0 | AL | 23-Apr | 24.2 | IN | 0 |
| **EB** | 30-Oct | 27.3 | OUT | -1 | EB | 01-Jan | 20.8 | IN | 0 | DE | 23-Apr | 24.2 | IN | 0 |
| **DE** | 30-Oct | 27.3 | OUT | 0 | AB | 01-Jan | 20.8 | IN | 0 | AL | 23-Apr | 24.9 | IN | 0 |
| **AL** | 30-Oct | 27.3 | IN | 0 | G-WA | 01-Jan | 22.1 | IN | 0 | EB | 23-Apr | 24.9 | IN | 0 |
| **EN** | 30-Oct | 27.3 | IN | 2 | G-MOS | 01-Jan | 22.1 | IN | 0 | AB | 23-Apr | 24.9 | IN | 0 |
| **AB** | 30-Oct | 27.3 | IN | 0 | DE | 02-Jan | 22 | IN | 0 | DE | 23-Apr | 24.9 | IN | 0 |
| **G-GH** | 30-Oct | 26.3 | IN | 0 | EB | 02-Jan | 22 | IN | 1 | G-SIN | 23-Apr | 24.5 | IN | 0 |
| **DE** | 31-Oct | 26 | IN | 0 | AB | 02-Jan | 22 | IN | 0 | G-RE | 23-Apr | 24.5 | IN | 0 |
| **EB** | 31-Oct | 26 | IN | 0 | AL | 02-Jan | 22 | IN | 0 | AL | 23-Apr | 24.5 | IN | 0 |
| **EN** | 31-Oct | 26 | IN | -1 | G-RA | 02-Jan | 22 | IN | 0 | DE | 23-Apr | 24.5 | IN | 0 |
| **DE** | 31-Oct | 26 | IN | 1 | G-OIN | 02-Jan | 22.3 | IN | 0 | G-GH | 24-Apr | 25.2 | IN | 0 |
| **AB** | 31-Oct | 26.1 | IN | 0 | G-NA | 02-Jan | 22.3 | IN | 0 | EB | 24-Apr | 25.2 | IN | 0 |
| **EN** | 31-Oct | 26.1 | IN | 0 | G-MU | 02-Jan | 22.3 | IN | 2 | AB | 24-Apr | 25.2 | IN | 0 |
| **DE** | 31-Oct | 26.7 | IN | 0 | G-ZA2 | 02-Jan | 22.3 | IN | 0 | DE | 24-Apr | 25.2 | IN | 0 |
| **EB** | 31-Oct | 26.7 | IN | -1 | DE | 04-Jan | 21.1 | IN | 0 | EB | 25-Apr | 25.7 | IN | 0 |
| **AL** | 31-Oct | 26.7 | IN | 0 | EB | 04-Jan | 21.1 | IN | -2 | AL | 25-Apr | 25.7 | IN | 0 |
| **G-RU** | 31-Oct | 26.3 | IN | 0 | AB | 04-Jan | 21.1 | IN | 0 | DE | 25-Apr | 25.7 | IN | 1 |
| **G-MOS** | 31-Oct | 26.3 | IN | 0 | DE | 05-Jan | 18.7 | IN | 0 | AB | 25-Apr | 25.7 | IN | 0 |
| **G-WA** | 31-Oct | 26.3 | IN | 1 | AB | 05-Jan | 18.7 | IN | 0 | EB | 26-Apr | 26.3 | IN | 1 |
| **DE** | 01-Nov | 25.7 | IN | -1 | EB | 05-Jan | 18.7 | IN | -1 | AL | 26-Apr | 26.3 | IN | 0 |
| **EB** | 01-Nov | 25.7 | IN | 0 | G-RU | 05-Jan | 18.7 | IN | -1 | AB | 26-Apr | 26.3 | IN | 0 |
| **EN** | 01-Nov | 25.7 | IN | 1 | G-MOS | 05-Jan | 18.7 | IN | -1 | EB | 27-Apr | 25.4 | IN | 0 |
| **G-SA** | 01-Nov | 25.7 | IN | 0 | EB | 06-Jan | 23.1 | IN | 0 | AL | 27-Apr | 25.4 | IN | 0 |
| **G-RA** | 01-Nov | 25.7 | IN | 1 | FR | 06-Jan | 23.1 | IN | 1 | AB | 27-Apr | 25.4 | IN | 0 |
| **EN** | 01-Nov | 25.7 | IN | 1 | SB | 06-Jan | 23.1 | IN | 0 | G-MOS | 28-Apr | 24.7 | IN | 0 |
| **G-GH** | 01-Nov | 25.7 | IN | 1 | DE | 07-Jan | 24.6 | IN | 0 | EB | 28-Apr | 24.7 | IN | 0 |
| **EN** | 01-Nov | 21 | OUT | -1 | EB | 07-Jan | 24.6 | IN | -1 | AB | 28-Apr | 24.7 | IN | 0 |
| **DE** | 01-Nov | 21 | OUT | -1 | AB | 07-Jan | 24.6 | IN | -1 | DE | 28-Apr | 24.7 | IN | 0 |
| **G-RE** | 01-Nov | 21 | IN | 0 | AL | 08-Jan | 20.8 | IN | 0 | AL | 28-Apr | 24.7 | IN | 0 |
| **G-SIN** | 01-Nov | 21 | IN | 0 | DE | 08-Jan | 20.8 | IN | 0 | G-NA | 28-Apr | 24.8 | IN | 0 |

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|---|---|---|---|---|
| **DE** | 02-Nov | 25 | IN | -1 |
| **G-NA** | 02-Nov | 25.7 | IN | -1 |
| **G-OM** | 02-Nov | 25.7 | IN | 0 |
| **G-MA** | 02-Nov | 25.7 | IN | 0 |
| **G-ALA** | 02-Nov | 25.7 | IN | 0 |
| **G-SIN** | 02-Nov | 25.7 | IN | 0 |
| **G-GH** | 02-Nov | 25.7 | IN | 0 |
| **G-RE** | 02-Nov | 25.7 | IN | 0 |
| **G-WA** | 02-Nov | 25.7 | IN | 0 |
| **G-AH** | 02-Nov | 25.7 | IN | 1 |
| **G-SA** | 02-Nov | 25.7 | IN | 0 |
| **EN** | 02-Nov | 25.7 | IN | 0 |
| **AB** | 04-May | 26.1 | IN | 0 |
| **DE** | 04-May | 26.1 | IN | 0 |
| **G-WA** | 05-May | 26.8 | IN | 2 |
| **G-MOS** | 05-May | 26.8 | IN | 0 |
| **G-RA** | 05-May | 26.8 | IN | 3 |
| **AL** | 05-May | 26.8 | IN | 0 |
| **YA** | 05-May | 26.8 | IN | 0 |
| **AB** | 05-May | 26.8 | IN | 0 |
| **DE** | 05-May | 26.8 | IN | 1 |
| **EB** | 05-May | 26.8 | IN | 0 |
| **EB** | 06-May | 27 | IN | 0 |
| **AL** | 06-May | 27 | IN | 0 |
| **DE** | 06-May | 27 | IN | 0 |
| **AB** | 06-May | 27 | IN | 0 |
| **G-RA** | 07-May | 26.8 | IN | 0 |
| **AL** | 07-May | 26.8 | IN | 0 |
| **YA** | 07-May | 26.8 | IN | 0 |
| **AB** | 07-May | 26.8 | IN | 0 |
| **DE** | 07-May | 26.8 | IN | 1 |
| **EB** | 07-May | 26.8 | IN | 1 |
| **DE** | 08-May | 20.8 | IN | 0 |
| **YA** | 08-May | 20.8 | IN | 0 |
| **EB** | 10-May | 24.9 | IN | 0 |
| **AB** | 10-May | 24.9 | IN | 0 |
| **YA** | 10-May | 24.9 | IN | 0 |
| **AL** | 10-May | 24.9 | IN | 0 |
| **DE** | 10-May | 24.9 | IN | 0 |
| **G-RA** | 10-May | 24.9 | IN | 0 |
| **G-WA** | 11-May | 24.9 | IN | 0 |
| **G-SIN** | 11-May | 24.9 | IN | 0 |
| **G-RE** | 11-May | 24.9 | IN | 0 |
| **G-GH** | 11-May | 24.9 | IN | 0 |
| **G-AB** | 11-May | 24.9 | IN | 2 |
| **AL** | 11-May | 24.9 | IN | 0 |
| **EB** | 11-May | 24.9 | IN | 0 |
| **YA** | 11-May | 24.9 | IN | 1 |
| **DE** | 11-May | 24.9 | IN | 0 |
| **AB** | 11-May | 24.9 | IN | 0 |
| **G-SIN** | 12-May | 16.1 | OUT | -1 |
| **G-RE** | 12-May | 16.1 | OUT | 0 |
| **YA** | 12-May | 16.1 | OUT | 0 |
| **AL** | 12-May | 16.1 | OUT | 0 |
| **G-GH** | 12-May | 16.1 | OUT | 0 |
| **G-AB** | 12-May | 16.1 | OUT | 0 |
| **DE** | 12-May | 16.1 | OUT | 0 |
| **AL** | 13-May | 25.6 | IN | 0 |
| **YA** | 13-May | 25.6 | IN | 0 |
| **DE** | 13-May | 25.6 | IN | 0 |
| **AB** | 13-May | 25.6 | IN | 0 |
| **EB** | 13-May | 24.6 | IN | 0 |
| **DE** | 13-May | 24.6 | IN | 0 |
| **AB** | 13-May | 24.6 | IN | 0 |
| **AL** | 14-May | 25.6 | IN | 0 |
| **YA** | 14-May | 25.6 | IN | 0 |
| **EB** | 14-May | 25.6 | IN | 0 |
| **AB** | 14-May | 25.6 | IN | 0 |
| **DE** | 14-May | 25.6 | IN | 0 |
| **AL** | 15-May | 25.9 | IN | 0 |
| **YA** | 15-May | 25.9 | IN | 0 |
| **AB** | 15-May | 25.9 | IN | 0 |
| **DE** | 15-May | 25.9 | IN | 1 |
| **G-GH** | 17-May | 27.3 | IN | 1 |
| **AL** | 17-May | 27.3 | IN | 1 |
| **EB** | 17-May | 27.3 | IN | 0 |
| **YA** | 17-May | 27.3 | IN | 1 |
| **DE** | 17-May | 27.3 | IN | 0 |
| **AB** | 17-May | 27.3 | IN | 0 |
| **G-SIN** | 18-May | 27.6 | IN | 0 |
| **G-RE** | 18-May | 27.6 | IN | 0 |
| **AL** | 18-May | 27.6 | IN | 0 |
| **YA** | 18-May | 27.6 | IN | 0 |
| **EB** | 20-May | 28.4 | IN | 0 |
| **AL** | 20-May | 28.4 | IN | 0 |
| **YA** | 20-May | 28.4 | IN | 1 |
| **AB** | 20-May | 28.4 | IN | 0 |
| **DE** | 20-May | 28.4 | IN | 0 |
| **G-NA** | 20-May | 27.9 | IN | 2 |
| **G-ALA** | 20-May | 27.9 | IN | 2 |
| **G-NA** | 21-May | 29.5 | OUT | 2 |
| **G-ALA** | 21-May | 29.5 | OUT | 1 |
| **AL** | 21-May | 29.5 | OUT | 2 |
| **YA** | 21-May | 29.5 | OUT | 2 |
| **DE** | 21-May | 29.5 | OUT | 2 |
| **EB** | 21-May | 29.5 | OUT | 1 |
| **EB** | 22-May | 28.9 | IN | 1 |
| **AL** | 22-May | 28.9 | IN | 2 |
| **YA** | 22-May | 28.9 | IN | 2 |
| **AB** | 22-May | 28.9 | IN | 1 |

| | | | | |
|---|---|---|---|---|
| G-SIN | 08-Jan | 20.8 | IN | -1 |
| G-RE | 08-Jan | 20.8 | IN | -1 |
| DE | 09-Jan | 20.1 | IN | 0 |
| EB | 09-Jan | 20.1 | IN | 0 |
| AL | 09-Jan | 20.1 | IN | 0 |
| DE | 10-Jan | 21.1 | IN | -1 |
| EB | 10-Jan | 21.1 | IN | 0 |
| AL | 10-Jan | 21.1 | IN | 0 |
| AB | 10-Jan | 21.1 | IN | 0 |
| DE | 12-Jan | 22.8 | IN | 0 |
| AB | 12-Jan | 22.8 | IN | 0 |
| G-SIN | 12-Jan | 21.9 | IN | 0 |
| AL | 16-Feb | 22.3 | IN | -1 |
| G-ZA | 16-Feb | 22.3 | IN | 0 |
| MA | 16-Feb | 22.3 | IN | 0 |
| INB | 16-Feb | 22.3 | IN | -1 |
| RE | 16-Feb | 22.3 | IN | -1 |
| DH | 16-Feb | 22.3 | IN | -1 |
| AL | 23-Feb | 18.4 | IN | 0 |
| G-MO | 23-Feb | 18.4 | IN | -1 |
| G-NA | 23-Feb | 18.4 | IN | -1 |
| G-RE | 23-Feb | 18.4 | IN | -1 |
| G-EM | 23-Feb | 18.4 | IN | -1 |
| RE | 23-Feb | 18.4 | IN | 0 |
| DH | 23-Feb | 18.4 | IN | -1 |
| AD | 23-Feb | 18.4 | IN | -1 |
| INB | 23-Feb | 18.4 | IN | 0 |
| MA | 23-Feb | 18.4 | IN | 0 |
| ZAA | 23-Feb | 18.4 | IN | 0 |
| AL | 26-Feb | 17.7 | IN | 0 |
| AD | 26-Feb | 17.7 | IN | 0 |
| DH | 26-Feb | 17.7 | IN | 0 |
| MA | 26-Feb | 17.7 | IN | 0 |
| INB | 26-Feb | 17.7 | IN | 0 |
| RE | 26-Feb | 17.7 | IN | 0 |
| ZAA | 26-Feb | 17.7 | IN | 0 |
| AL | 17-Feb | 18.7 | IN | 0 |
| G-ZA | 17-Feb | 18.7 | IN | 0 |
| G-AR | 17-Feb | 18.7 | IN | 0 |
| MA | 17-Feb | 18.7 | IN | 0 |
| INB | 17-Feb | 18.7 | IN | 0 |
| RE | 17-Feb | 18.7 | IN | 0 |
| AD | 17-Feb | 18.7 | IN | 0 |
| DH | 17-Feb | 18.7 | IN | 0 |
| ZAA | 17-Feb | 18.7 | IN | 0 |
| AL | 18-Aug | 20.3 | IN | 0 |
| RE | 18-Aug | 20.3 | IN | 0 |
| INB | 18-Aug | 20.3 | IN | 0 |
| DH | 18-Aug | 20.3 | IN | 0 |
| ZAA | 18-Aug | 20.3 | IN | 0 |
| AD | 18-Aug | 20.3 | IN | 0 |
| G-AH | 18-Aug | 20.3 | IN | 0 |
| AL | 09-Mar | 20.9 | IN | 0 |
| INB | 09-Mar | 20.9 | IN | 0 |
| RE | 09-Mar | 20.9 | IN | 0 |
| MA | 09-Mar | 20.9 | IN | 0 |
| G-ZA | 09-Mar | 20.9 | IN | 0 |
| G-KA | 09-Mar | 20.9 | IN | 0 |
| AL | 13-Mar | 22.3 | IN | 0 |
| RE | 13-Mar | 22.3 | IN | 0 |
| INB | 13-Mar | 22.3 | IN | 0 |
| MA | 13-Mar | 22.3 | IN | 0 |
| DH | 13-Mar | 22.3 | IN | 0 |
| AD | 13-Mar | 22.3 | IN | 0 |
| ZAA | 13-Mar | 22.3 | IN | 0 |
| AL | 13-Mar | 22.3 | IN | 0 |
| MA | 15-Mar | 22.3 | IN | 0 |
| G-ZA | 15-Mar | 22.3 | IN | 0 |
| G-WA | 15-Mar | 22.3 | IN | 0 |
| G-HU | 15-Mar | 22.3 | IN | 0 |
| G-AH | 15-Mar | 22.3 | IN | 0 |
| AL | 22-Mar | 24.1 | IN | 0 |
| RE | 22-Mar | 24.1 | IN | 0 |
| G-RA | 22-Mar | 24.1 | IN | 0 |
| DH | 22-Mar | 24.1 | IN | 0 |
| ZAA | 22-Mar | 24.1 | IN | 0 |
| AD | 22-Mar | 24.1 | IN | 0 |
| MA | 22-Mar | 24.1 | IN | 0 |
| INB | 22-Mar | 24.1 | IN | 0 |
| AL | 28-Mar | 24.1 | IN | 0 |
| INB | 28-Mar | 24.1 | IN | 0 |
| MA | 28-Mar | 24.1 | IN | 0 |
| RE | 28-Mar | 24.1 | IN | 0 |
| DH | 28-Mar | 24.1 | IN | 0 |
| AL | 30-Mar | 23.7 | IN | 0 |
| ZAA | 30-Mar | 23.7 | IN | 0 |
| RE | 30-Mar | 23.7 | IN | 0 |
| INB | 30-Mar | 23.7 | IN | 0 |
| DH | 30-Mar | 23.7 | IN | 0 |
| MA | 30-Mar | 23.7 | IN | 0 |
| AL | 13-Jun | 31.7 | IN | 1 |
| AD | 13-Jun | 31.7 | IN | 2 |
| DH | 13-Jun | 31.7 | IN | 2 |
| RE | 13-Jun | 31.7 | IN | 2 |
| INB | 13-Jun | 31.7 | IN | 1 |
| G-ZA | 13-Jun | 31.7 | IN | 1 |
| AL | 21-Jun | 31 | IN | 2 |
| ZAA | 21-Jun | 31 | IN | 2 |
| DH | 21-Jun | 31 | IN | 3 |
| MA | 21-Jun | 31 | IN | 2 |

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|---|---|---|---|---|
| G-ALA | 28-Apr | 24.8 | IN | 0 |
| AL | 28-Apr | 24.8 | IN | 1 |
| AL | 29-Apr | 24.7 | IN | 0 |
| EB | 29-Apr | 24.7 | IN | 0 |
| YA | 29-Apr | 24.7 | IN | 0 |
| DE | 29-Apr | 24.7 | IN | 0 |
| AB | 29-Apr | 24.7 | IN | -1 |
| G-RA | 30-Apr | 25.4 | IN | 0 |
| AL | 30-Apr | 25.4 | IN | 0 |
| EB | 30-Apr | 25.4 | IN | 0 |
| EB | 04-May | 26.1 | IN | 0 |
| YA | 04-May | 26.1 | IN | 0 |
| MO | 16-Jul | 29.4 | IN | 0 |
| DH | 16-Jul | 29.4 | IN | 0 |
| AH | 18-Jul | 25.5 | IN | 0 |
| MS | 18-Jul | 25.5 | IN | -1 |
| DH | 18-Jul | 25.5 | IN | 0 |
| HU | 18-Jul | 25.5 | IN | 0 |
| MO | 18-Jul | 25.5 | IN | -1 |
| WA | 18-Jul | 25.5 | IN | 0 |
| AH | 24-Jul | 25.9 | IN | -1 |
| HU | 24-Jul | 25.9 | IN | -1 |
| MS | 24-Jul | 25.9 | IN | 0 |
| WA | 24-Jul | 25.9 | IN | 0 |
| AH | 25-Jul | 27.8 | IN | 0 |
| DH | 25-Jul | 27.8 | IN | 0 |
| HU | 25-Jul | 27.8 | IN | 0 |
| WA | 25-Jul | 27.8 | IN | 0 |
| AH | 26-Jul | 27.6 | IN | 0 |
| WA | 26-Jul | 27.6 | IN | 0 |
| DH | 26-Jul | 27.6 | IN | -1 |
| HU | 26-Jul | 27.6 | IN | 0 |
| AH | 26-Jul | 33.9 | OUT | 2 |
| DH | 26-Jul | 33.9 | OUT | 2 |
| AH | 27-Jul | 28.6 | IN | 1 |
| WA | 27-Jul | 28.6 | IN | 1 |
| MS | 27-Jul | 28.6 | IN | 0 |
| HU | 27-Jul | 28.6 | IN | 0 |
| DH | 27-Jul | 28.6 | IN | 1 |
| AH | 28-Jul | 26.1 | IN | 0 |
| AH | 28-Jul | 29.8 | OUT | 1 |
| AH | 29-Jul | 29.6 | IN | 2 |
| AH | 29-Jul | 31.8 | OUT | 2 |
| AH | 30-Jul | 29.2 | IN | 1 |
| AH | 03-Aug | 31.4 | OUT | 1 |
| AH | 03-Aug | 25.9 | IN | -1 |
| AH | 03-Aug | 32.3 | OUT | 1 |
| AH | 05-Aug | 29.7 | IN | 1 |
| MO | 05-Aug | 29.7 | IN | 1 |
| HU | 05-Aug | 29.7 | IN | 2 |
| AH | 05-Aug | 29.7 | OUT | 2 |
| AH | 08-Aug | 31.9 | IN | -1 |
| MO | 08-Aug | 25.4 | IN | -1 |
| MS | 09-Aug | 25.4 | IN | 1 |
| WA | 09-Aug | 29.5 | IN | 1 |
| AH | 09-Aug | 29.5 | IN | 1 |
| HU | 09-Aug | 29.5 | IN | 1 |
| DH | 09-Aug | 29.5 | IN | 1 |
| AH | 10-Aug | 24.5 | IN | 0 |
| WA | 10-Aug | 24.5 | IN | 0 |
| MS | 10-Aug | 24.5 | IN | 0 |
| DH | 10-Aug | 24.5 | IN | 0 |
| AH | 10-Aug | 33.2 | OUT | 1 |
| WA | 10-Aug | 33.2 | OUT | 1 |
| MS | 10-Aug | 33.2 | OUT | 1 |
| DH | 10-Aug | 33.2 | OUT | 1 |
| AH | 11-Aug | 25.7 | IN | -1 |
| MO | 11-Aug | 25.7 | IN | -1 |
| WA | 11-Aug | 25.7 | IN | 0 |
| AH | 16-Aug | 29.3 | IN | 1 |
| DH | 16-Aug | 29.3 | IN | 1 |
| HU | 16-Aug | 29.3 | IN | 2 |
| AH | 16-Aug | 26.4 | IN | 0 |
| HU | 16-Aug | 26.4 | IN | 0 |
| DH | 16-Aug | 26.4 | IN | -1 |
| MS | 16-Aug | 26.4 | IN | 0 |
| AH | 26-Aug | 26 | IN | 0 |
| MO | 26-Aug | 26 | IN | 0 |
| MS | 26-Aug | 26 | IN | 0 |
| WA | 26-Aug | 26 | IN | 0 |
| AH | 26-Aug | 27.3 | OUT | 0 |
| AH | 30-Aug | 29.3 | IN | 0 |
| MS | 30-Aug | 29.3 | IN | 0 |
| WA | 30-Aug | 29.3 | IN | 0 |
| HU | 30-Aug | 29.3 | IN | 0 |
| DH | 30-Aug | 29.3 | IN | 0 |
| AH | 30-Aug | 29.5 | IN | 0 |
| AH | 01-Sep | 29.3 | IN | 1 |
| MS | 01-Sep | 29.3 | IN | 1 |
| MO | 01-Sep | 29.3 | IN | 1 |
| WA | 01-Sep | 29.3 | IN | 0 |
| AH | 01-Sep | 30.4 | OUT | 1 |
| MO | 01-Sep | 30.4 | OUT | 1 |
| AH | 03-Sep | 24.6 | IN | 0 |
| MS | 03-Sep | 24.6 | IN | 0 |
| WA | 03-Sep | 24.6 | IN | 0 |
| HU | 03-Sep | 24.6 | IN | 0 |
| AH | 03-Sep | 35.2 | OUT | 1 |
| MS | 03-Sep | 35.2 | OUT | 1 |
| AH | 06-Sep | 29.1 | IN | 1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DE** | 22-May | 28.9 | IN | 2 | RE | 21-Jun | 31 | IN | 3 | WA | 06-Sep | 29.1 | IN | 0 |
| **G-WA** | 26-May | 28.2 | IN | 0 | AD | 21-Jun | 31 | IN | 2 | DH | 06-Sep | 29.1 | IN | 0 |
| **G-MOS** | 26-May | 28.2 | IN | 1 | INB | 21-Jun | 31 | IN | 2 | MO | 06-Sep | 29.1 | IN | 0 |
| **G-RU** | 26-May | 28.2 | IN | 0 | AL | 23-Jun | 29.3 | IN | 0 | AH | 06-Sep | 29.2 | OUT | 1 |
| **EB** | 26-May | 28.2 | IN | 0 | MA | 23-Jun | 29.3 | IN | 0 | AH | 07-Sep | 29 | OUT | 1 |
| **DE** | 26-May | 28.2 | IN | 1 | AD | 23-Jun | 29.3 | IN | 1 | HU | 07-Sep | 29 | IN | 0 |
| **AB** | 26-May | 28.2 | IN | 0 | INB | 23-Jun | 29.3 | IN | 0 | MO | 07-Sep | 29 | IN | 0 |
| **AL** | 27-May | 26.6 | IN | 0 | ZAA | 23-Jun | 29.3 | IN | 2 | AH | 07-Sep | 30 | OUT | 1 |
| **YA** | 27-May | 26.6 | IN | 0 | RE | 23-Jun | 29.3 | IN | 2 | AH | 10-Sep | 29.4 | IN | 0 |
| **EB** | 27-May | 26.6 | IN | 0 | AL | 02-Apr | 24.9 | IN | 0 | WA | 10-Sep | 29.4 | IN | 0 |
| **DE** | 27-May | 26.6 | IN | 0 | ZAA | 02-Apr | 24.9 | IN | 0 | DH | 10-Sep | 29.4 | IN | 0 |
| **AB** | 27-May | 26.6 | IN | 0 | INB | 02-Apr | 24.9 | IN | 0 | HU | 10-Sep | 29.4 | IN | 0 |
| **G-GH** | 28-May | 26.4 | IN | 0 | MA | 02-Apr | 24.9 | IN | 0 | AH | 11-Sep | 28.4 | IN | 0 |
| **EB** | 28-May | 26.4 | IN | 0 | DH | 02-Apr | 24.9 | IN | 0 | DH | 11-Sep | 28.4 | IN | 0 |
| **AL** | 28-May | 26.4 | IN | 0 | AD | 02-Apr | 24.9 | IN | 0 | WA | 11-Sep | 28.4 | IN | 0 |
| **YA** | 28-May | 26.4 | IN | 0 | AL | 04-Apr | 27.7 | IN | 1 | HU | 11-Sep | 28.4 | IN | 0 |
| **DE** | 28-May | 26.4 | IN | 0 | ZAA | 04-Apr | 27.7 | IN | 2 | AH | 11-Sep | 28.4 | IN | 0 |
| **AB** | 28-May | 26.4 | IN | 0 | AD | 04-Apr | 27.7 | IN | 0 | AH | 11-Sep | 28.7 | OUT | 0 |
| **G-RA** | 02-Jul | 29.2 | IN | 0 | MA | 04-Apr | 27.7 | IN | 0 | HU | 12-Sep | 24.9 | IN | -1 |
| **AL** | 02-Jul | 29.2 | IN | 2 | INB | 04-Apr | 27.7 | IN | 1 | DH | 12-Sep | 24.9 | IN | -1 |
| **EB** | 02-Jul | 29.2 | IN | 0 | G-ZA | 04-Apr | 27.7 | IN | 1 | WA | 12-Sep | 24.9 | IN | 0 |
| **YA** | 02-Jul | 29.2 | IN | 1 | G-SA | 04-Apr | 27.7 | IN | 2 | AH | 18-Sep | 26.7 | IN | 0 |
| **G-MD** | 02-Jul | 29.2 | IN | 1 | G-AR | 04-Apr | 27.7 | IN | 1 | MS | 16-Sep | 26.7 | IN | 0 |
| **AB** | 02-Jul | 29.2 | IN | 0 | G-KA | 04-Apr | 27.7 | IN | 2 | AH | 20-Sep | 25.1 | IN | -1 |
| **DE** | 02-Jul | 29.2 | IN | 1 | AL | 09-Apr | 28.1 | IN | 0 | MO | 20-Sep | 25.1 | IN | -1 |
| **G-MOS** | 02-Jul | 33.9 | OUT | 3 | INB | 09-Apr | 28.1 | IN | 0 | MS | 20-Sep | 25.1 | IN | 0 |
| **G-RU** | 02-Jul | 33.9 | OUT | 3 | ZAA | 09-Apr | 28.1 | IN | 0 | AH | 20-Sep | 27.7 | OUT | 0 |
| **YA** | 02-Jul | 33.9 | OUT | 3 | RE | 09-Apr | 28.1 | IN | 0 | AH | 12-Oct | 27.4 | IN | 0 |
| **AL** | 02-Jul | 33.9 | OUT | 3 | MA | 20-Apr | 26.1 | IN | 0 | WA | 12-Oct | 27.4 | IN | 0 |
| **DE** | 02-Jul | 33.9 | OUT | 3 | G-MO | 20-Apr | 26.1 | IN | 1 | DH | 12-Oct | 27.4 | IN | 0 |
| **EB** | 02-Jul | 33.9 | OUT | 3 | G-EM | 20-Apr | 26.1 | IN | 0 | AH | 12-Oct | 25.1 | OUT | 0 |
| **EB** | 07-Jul | 67.5 | OUT | 3 | DH | 20-Apr | 26.1 | IN | 1 | AH | 13-Oct | 27.3 | IN | 0 |
| **YA** | 07-Jul | 67.5 | OUT | 3 | AD | 20-Apr | 26.1 | IN | 0 | MO | 13-Oct | 27.3 | IN | 0 |
| **DE** | 07-Jul | 67.5 | OUT | 3 | G-AH3 | 20-Apr | 26.1 | IN | 0 | WA | 13-Oct | 27.3 | IN | 0 |
| **G-ZAH** | 07-Jul | 27.2 | IN | 0 | AL | 20-Apr | 26.1 | IN | 0 | AH | 14-Oct | 27.3 | IN | 0 |
| **G-MOS** | 07-Jul | 27.2 | IN | 1 | G-NA | 20-Apr | 26.1 | IN | 1 | MS | 14-Oct | 27.3 | IN | 0 |
| **G-GH** | 07-Jul | 27.2 | IN | 0 | AL | 23-Apr | 20 | IN | 0 | WA | 14-Oct | 27.3 | IN | 0 |
| **AL** | 28-May | 29.4 | OUT | 1 | AD | 23-Apr | 20 | IN | 0 | DH | 14-Oct | 27.3 | IN | 0 |
| **YA** | 28-May | 29.4 | OUT | 1 | DH | 23-Apr | 20 | IN | -1 | AH | 14-Oct | 26.3 | OUT | 0 |
| **AB** | 28-May | 29.4 | OUT | 1 | MA | 23-Apr | 20 | IN | 0 | AH | 17-Oct | 27.3 | IN | 1 |
| **DE** | 28-May | 29.4 | OUT | 1 | AL | 24-Apr | 24.9 | IN | 0 | DH | 17-Oct | 27.3 | IN | 0 |
| **YA** | 31-May | 25.9 | IN | 0 | MA | 24-Apr | 24.9 | IN | 0 | WA | 17-Oct | 27.3 | IN | 0 |
| **AB** | 31-May | 25.9 | IN | 0 | INB | 24-Apr | 24.9 | IN | 0 | HU | 17-Oct | 27.3 | IN | 0 |
| **EB** | 31-May | 25.9 | IN | 0 | ZAA | 24-Apr | 24.9 | IN | 0 | MS | 17-Oct | 27.3 | IN | 1 |
| **DE** | 31-May | 25.9 | IN | 0 | RE | 24-Apr | 24.9 | IN | 0 | AH | 17-Oct | 27.4 | OUT | 1 |
| **G-AR** | 02-Jun | 25.6 | IN | 0 | DH | 24-Apr | 24.9 | IN | 0 | AH | 21-Oct | 25.4 | IN | 0 |
| **G-SA** | 02-Jun | 25.6 | IN | 0 | AD | 24-Apr | 24.9 | IN | 0 | MO | 21-Oct | 25.4 | IN | 0 |
| **EB** | 02-Jun | 25.6 | IN | 0 | AL | 03-May | 26.3 | IN | 0 | WA | 21-Oct | 25.4 | IN | 0 |
| **DE** | 02-Jun | 25.6 | IN | -1 | RE | 03-May | 26.3 | IN | 0 | DH | 21-Oct | 25.3 | IN | -1 |
| **G-SIN** | 05-Jun | 28.3 | IN | 0 | INB | 03-May | 26.3 | IN | 0 | AH | 22-Oct | 26.4 | IN | 1 |
| **G-RE** | 05-Jun | 28.3 | IN | 0 | AD | 03-May | 26.3 | IN | 0 | DH | 22-Oct | 26.4 | IN | 0 |
| **AL** | 05-Jun | 28.3 | IN | 0 | DH | 03-May | 26.3 | IN | 0 | MO | 22-Oct | 26.4 | IN | 0 |
| **YA** | 05-Jun | 28.3 | IN | 0 | ZAA | 03-May | 26.3 | IN | 0 | MS | 22-Oct | 26.4 | IN | 1 |
| **EB** | 05-Jun | 28.3 | IN | 0 | AL | 04-May | 25.9 | IN | 0 | WA | 22-Oct | 26.4 | IN | 0 |
| **DE** | 05-Jun | 28.3 | IN | 0 | DH | 04-May | 25.9 | IN | 0 | AH | 22-Oct | 24.8 | OUT | 0 |
| **AL** | 09-Jun | 27.3 | IN | 0 | ZAA | 04-May | 25.9 | IN | 0 | AH | 23-Oct | 25.2 | IN | 0 |
| **EB** | 09-Jun | 27.3 | IN | 0 | G-ZA | 04-May | 25.9 | IN | 1 | HU | 23-Oct | 25.2 | IN | 0 |
| **YA** | 09-Jun | 27.3 | IN | 0 | MA | 04-May | 25.9 | IN | 0 | MS | 23-Oct | 25.2 | IN | 0 |
| **AB** | 09-Jun | 27.3 | IN | 2 | INB | 04-May | 25.9 | IN | 0 | WA | 23-Oct | 25.2 | IN | 0 |
| **DE** | 09-Jun | 27.3 | IN | 1 | RE | 04-May | 25.9 | IN | 0 | MO | 23-Oct | 25.2 | IN | 0 |
| **AL** | 11-Jun | 28.3 | IN | 0 | AD | 04-May | 25.9 | IN | 0 | DH | 23-Oct | 25.2 | IN | 0 |
| **EB** | 11-Jun | 28.3 | IN | 1 | AL | 06-May | 27 | IN | 0 | AH | 23-Oct | 24.3 | OUT | 0 |
| **YA** | 11-Jun | 28.3 | IN | 0 | G-AH | 06-May | 27 | IN | 0 | DH | 25-Oct | 24.4 | IN | -1 |
| **DE** | 11-Jun | 28.3 | IN | 0 | INB | 06-May | 27 | IN | 1 | WA | 25-Oct | 24.3 | IN | 0 |
| **AB** | 11-Jun | 28.3 | IN | 0 | DH | 06-May | 27 | IN | 1 | AH | 30-Oct | 22.7 | IN | -1 |
| **G-AB** | 13-Jun | 26.2 | IN | 0 | MA | 06-May | 27 | IN | 0 | MO | 30-Oct | 22.7 | IN | 0 |
| **G-RA** | 13-Jun | 26.2 | IN | 0 | AL | 27-Apr | 23.6 | IN | 0 | MS | 30-Oct | 22.7 | IN | 0 |
| **AL** | 13-Jun | 26.2 | IN | 0 | DH | 27-Apr | 23.6 | IN | -1 | AH | 31-Oct | 17.4 | IN | 0 |
| **EB** | 13-Jun | 26.2 | IN | 0 | RE | 27-Apr | 23.6 | IN | 0 | WA | 31-Oct | 17.4 | IN | 0 |
| **AB** | 13-Jun | 26.2 | IN | 0 | INB | 27-Apr | 23.6 | IN | 0 | MS | 31-Oct | 17.4 | IN | 0 |
| **DE** | 13-Jun | 26.2 | IN | 0 | MA | 27-Apr | 23.6 | IN | -1 | AH | 01-Nov | 22.7 | IN | 0 |
| **G-ZAH** | 13-Jun | 26.2 | IN | 0 | ZAA | 27-Apr | 23.6 | IN | 0 | MO | 01-Nov | 22.7 | IN | 0 |
| **G-SIN** | 13-Jun | 27.8 | IN | 0 | AD | 27-Apr | 23.6 | IN | -1 | MS | 01-Nov | 22.7 | IN | 0 |
| **G-RE** | 13-Jun | 27.8 | IN | 0 | AL | 28-Apr | 23.1 | IN | 0 | WA | 01-Nov | 22.7 | IN | -1 |
| **G-RA** | 13-Jun | 27.8 | IN | 0 | G-ZA | 28-Apr | 23.1 | IN | 0 | HU | 01-Nov | 22.7 | IN | 0 |
| **G-GH** | 13-Jun | 27.8 | IN | 0 | RE | 28-Apr | 23.1 | IN | 0 | AH | 02-Nov | 22.6 | OUT | 0 |
| **YA** | 13-Jun | 27.8 | IN | 0 | MA | 28-Apr | 23.1 | IN | 0 | AH | 02-Nov | 23.5 | IN | 0 |
| **DE** | 13-Jun | 27.8 | IN | 0 | INB | 28-Apr | 23.1 | IN | 0 | MO | 02-Nov | 23.5 | IN | 0 |
| **AB** | 13-Jun | 27.8 | IN | 0 | AL | 01-May | 27.3 | IN | 0 | WA | 02-Nov | 23.5 | IN | 0 |
| **G-SIN** | 14-Jun | 30.2 | OUT | 0 | DH | 01-May | 27.3 | IN | 1 | HU | 02-Nov | 23.5 | IN | 0 |
| **G-RE** | 14-Jun | 30.2 | OUT | 0 | MA | 01-May | 27.3 | IN | 0 | AH | 02-Nov | 23.9 | OUT | 0 |
| **G-RA** | 14-Jun | 30.2 | OUT | 2 | ZAA | 01-May | 27.3 | IN | 1 | KA | 27-Oct | 25.1 | IN | 0 |
| **AB** | 14-Jun | 30.2 | OUT | 0 | AD | 01-May | 27.3 | IN | 0 | G-HU | 27-Oct | 24.8 | IN | 0 |
| **G-GH** | 14-Jun | 30.2 | OUT | 0 | RE | 01-May | 27.3 | IN | 0 | G-WA | 27-Oct | 25.3 | IN | 0 |
| **DE** | 14-Jun | 30.2 | OUT | 0 | INB | 01-May | 27.3 | IN | 0 | G-AH | 27-Oct | 25.5 | IN | 0 |
| **G-NA** | 15-Jun | 26 | IN | 0 | AL | 09-May | 24 | IN | -1 | ZA | 27-Oct | 25.5 | IN | 0 |
| **G-SIN** | 15-Jun | 26 | IN | 0 | INB | 09-May | 24 | IN | 0 | ZA | 27-Oct | 25.4 | IN | 1 |
| **G-MOS** | 15-Jun | 26 | IN | 1 | MA | 09-May | 24 | IN | 0 | KA | 29-Oct | 24.5 | IN | 1 |
| **G-AG** | 15-Jun | 26 | IN | 0 | AL | 09-May | 23.2 | OUT | -2 | KA | 29-Oct | 24.9 | IN | 1 |
| **G-RA** | 15-Jun | 26 | IN | 0 | INB | 09-May | 23.2 | OUT | -2 | G-HU | 29-Oct | 25.3 | IN | 0 |
| **G-ALA** | 15-Jun | 26 | IN | 0 | MA | 09-May | 23.2 | OUT | -2 | G-WA | 29-Oct | 25.4 | IN | 0 |
| **G-RE** | 15-Jun | 25.8 | IN | 0 | RE | 09-May | 23.2 | OUT | -2 | G-MA | 29-Oct | 25.5 | IN | 1 |
| **G-RU** | 15-Jun | 25.8 | IN | 0 | AL | 10-May | 23.2 | IN | 0 | ZA | 30-Oct | 25.7 | IN | 0 |
| **MO** | 15-Jun | 25.8 | IN | 0 | MA | 10-May | 23.2 | IN | 0 | ZA | 31-Oct | 22.9 | IN | 0 |
| **G-WA** | 15-Jun | 25.8 | IN | 0 | INB | 10-May | 23.2 | IN | 0 | ZA | 01-Nov | 23.4 | IN | 0 |
| **YA** | 15-Jun | 25.8 | IN | 0 | ZAA | 10-May | 23.2 | IN | 1 | KA | 01-Jan | 23.9 | OUT | 0 |
| **G-NA** | 16-Jun | 25.5 | IN | 0 | AL | 10-May | 18.2 | OUT | -1 | ZA | 02-Nov | 24.5 | OUT | 0 |
| **G-EB** | 16-Jun | 25.5 | IN | 0 | INB | 10-May | 18.2 | OUT | 0 | KA | 03-Nov | 23.7 | IN | 1 |
| **G-GH** | 16-Jun | 25.5 | IN | -2 | MA | 10-May | 18.2 | OUT | -2 | ZA | 03-Nov | 23.7 | IN | 0 |
| **YA** | 16-Jun | 25.5 | IN | 0 | RE | 10-May | 18.2 | OUT | -2 | ZA | 05-Nov | 22.3 | IN | 1 |

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|---|---|---|---|---|
| **EB** | 16-Jun | 25.5 | IN | -2 |
| **DE** | 16-Jun | 25.5 | IN | 0 |
| **G-SIN** | 16-Jun | 25.5 | IN | 0 |
| **G-RE** | 16-Jun | 25.5 | IN | -2 |
| **G-RA** | 16-Jun | 25.5 | IN | 0 |
| **G-MOS2** | 16-Jun | 25.5 | IN | 0 |
| **G-AB** | 16-Jun | 25.5 | IN | 0 |
| **AL** | 16-Jun | 25.5 | IN | 0 |
| **G-SIN** | 17-Jun | 26.2 | IN | 0 |
| **G-RE** | 17-Jun | 26.2 | IN | 0 |
| **G-RA** | 17-Jun | 26.2 | IN | 0 |
| **G-WA** | 17-Jun | 26.2 | IN | -1 |
| **EB** | 17-Jun | 26.2 | IN | -1 |
| **AL** | 17-Jun | 26.2 | IN | 0 |
| **YA** | 17-Jun | 26.2 | IN | 0 |
| **MO** | 17-Jun | 26.2 | IN | 0 |
| **DE** | 17-Jun | 26.2 | IN | 0 |
| **G-SIN** | 18-Jun | 29 | OUT | 0 |
| **G-RE** | 18-Jun | 29 | OUT | 0 |
| **G-RA** | 18-Jun | 29 | OUT | 2 |
| **G-AB** | 18-Jun | 29 | OUT | 2 |
| **YA** | 18-Jun | 29 | OUT | 0 |
| **AL** | 18-Jun | 29 | OUT | 0 |
| **DE** | 18-Jun | 29 | OUT | 1 |
| **EB** | 18-Jun | 29 | OUT | 0 |
| **AB** | 18-Jun | 29 | OUT | 0 |
| **AB** | 22-Jan | 26.4 | IN | 0 |
| **AL** | 22-Jan | 26.4 | IN | 0 |
| **G-MO** | 22-Jan | 26.4 | IN | 0 |
| **YA** | 22-Jan | 26.4 | IN | 0 |
| **DE** | 22-Jan | 26.4 | IN | 0 |
| **EB** | 23-Jan | 27.9 | IN | 0 |
| **MO** | 23-Jan | 27.9 | IN | 0 |
| **YA** | 23-Jan | 27.9 | IN | 0 |
| **DE** | 23-Jan | 27.9 | IN | 0 |
| **AB** | 23-Jan | 27.9 | IN | 0 |
| **G-YO** | 26-Jan | 27.5 | IN | 0 |
| **GKA** | 26-Jan | 27.5 | IN | 0 |
| **G-RA** | 26-Jan | 27.5 | IN | 0 |
| **EB** | 26-Jan | 27.5 | IN | 1 |
| **G-AB** | 26-Jan | 27.5 | IN | 0 |
| **YA** | 26-Jan | 27.5 | IN | 0 |
| **MO** | 26-Jan | 27.5 | IN | 0 |
| **AB** | 26-Jan | 27.5 | IN | 0 |
| **G-HA** | 26-Jan | 27.5 | IN | 0 |
| **G-WA** | 28-Jun | 26.7 | IN | 0 |
| **MO** | 28-Jun | 26.7 | IN | 0 |
| **EB** | 28-Jun | 26.7 | IN | 0 |
| **AL** | 28-Jun | 26.7 | IN | 0 |
| **YA** | 28-Jun | 26.7 | IN | 0 |
| **DE** | 28-Jun | 26.7 | IN | 0 |
| **AB** | 28-Jun | 26.7 | IN | 0 |
| **YA** | 29-Jun | 64.6 | OUT | 3 |
| **AB** | 29-Jun | 64.6 | OUT | 3 |
| **DE** | 29-Jun | 64.6 | OUT | 3 |
| **EB** | 29-Jun | 64.6 | OUT | 3 |
| **G-GH** | 30-Jun | 27.6 | IN | 0 |
| **G-MOS** | 30-Jun | 27.6 | IN | 0 |
| **G-RU** | 30-Jun | 27.6 | IN | 0 |
| **DE** | 30-Jun | 27.6 | IN | 0 |
| **AL** | 30-Jun | 27.6 | IN | 0 |
| **AB** | 30-Jun | 27.6 | IN | 0 |
| **EB** | 30-Jun | 27.6 | IN | 0 |
| **YA** | 30-Jun | 27.6 | IN | 1 |
| **G-RA** | 02-Jul | 29.2 | IN | 0 |
| **AL** | 02-Jul | 29.2 | IN | 2 |
| **EB** | 02-Jul | 29.2 | IN | 0 |
| **YA** | 02-Jul | 29.2 | IN | 1 |
| **MO** | 02-Jul | 29.2 | IN | 1 |
| **AB** | 02-Jul | 29.2 | IN | 0 |
| **DE** | 02-Jul | 29.2 | IN | 1 |
| **G-MOS** | 02-Jul | 33.9 | OUT | 3 |
| **G-RU** | 02-Jul | 33.9 | OUT | 3 |
| **YA** | 02-Jul | 33.9 | OUT | 3 |
| **AL** | 02-Jul | 33.9 | OUT | 3 |
| **DE** | 02-Jul | 33.9 | OUT | 3 |
| **EB** | 02-Jul | 33.9 | OUT | 3 |
| **EB** | 02-Jul | 33.9 | OUT | 3 |
| **YA** | 07-Jul | 67.5 | OUT | 3 |
| **DE** | 07-Jul | 67.5 | OUT | 3 |
| **G-ZAH** | 07-Jul | 27.2 | IN | 0 |
| **G-MOS** | 07-Jul | 27.2 | IN | 1 |
| **G-GH** | 07-Jul | 27.2 | IN | 0 |
| **EB** | 09-Jul | 28.5 | IN | 0 |
| **AL** | 09-Jul | 28.5 | IN | 0 |
| **YA** | 09-Jul | 28.5 | IN | 0 |
| **MO** | 09-Jul | 28.5 | IN | 0 |
| **DE** | 09-Jul | 28.5 | IN | 0 |
| **AB** | 09-Jul | 28.5 | IN | 0 |
| **G-NA** | 09-Jul | 28 | IN | 0 |
| **G-ALA** | 09-Jul | 28 | IN | 0 |
| **G-SIN** | 09-Jul | 28 | IN | 0 |
| **G-RE** | 09-Jul | 28 | IN | 0 |
| **G-RA** | 09-Jul | 28 | IN | 0 |
| **G-NA** | 10-Jul | 31.5 | OUT | 0 |
| **G-SIN** | 10-Jul | 31.5 | OUT | 1 |
| **G-ALA** | 10-Jul | 31.5 | OUT | 0 |
| **G-RE** | 10-Jul | 31.5 | OUT | 1 |
| **G-MOS2** | 10-Jul | 31.5 | OUT | 2 |
| **G-RA** | 10-Jul | 31.5 | OUT | 2 |

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|---|---|---|---|---|
| AL | 11-May | 22.8 | IN | 1 |
| AD | 11-May | 22.8 | IN | 0 |
| RE | 11-May | 22.8 | IN | 0 |
| INB | 11-May | 22.8 | IN | 0 |
| AL | 13-May | 24.9 | IN | 0 |
| INB | 13-May | 24.9 | IN | 0 |
| MA | 13-May | 24.9 | IN | 0 |
| ZAA | 13-May | 24.9 | IN | 0 |
| AD | 13-May | 24.9 | IN | 0 |
| AL | 13-May | 20.2 | OUT | 0 |
| MA | 13-May | 20.2 | OUT | -3 |
| AD | 13-May | 20.2 | OUT | 0 |
| RE | 13-May | 20.2 | OUT | 0 |
| AL | 16-May | 24.9 | IN | -1 |
| G-AH | 16-May | 24.9 | IN | 0 |
| AD | 16-May | 24.9 | IN | 0 |
| RE | 16-May | 24.9 | IN | 0 |
| AL | 19-May | 26.3 | IN | 0 |
| AD | 19-May | 26.3 | IN | 0 |
| DH | 19-May | 26.3 | IN | 0 |
| INB | 19-May | 26.3 | IN | 0 |
| RE | 19-May | 26.3 | IN | 0 |
| ZAA | 19-May | 26.3 | IN | 0 |
| AL | 19-May | 26.3 | IN | 0 |
| DH | 19-May | 26.3 | IN | 1 |
| INB | 19-May | 26.3 | IN | 2 |
| ZAA | 19-May | 26.3 | IN | 0 |
| RE | 19-May | 26.3 | IN | 2 |
| AL | 20-May | 28.1 | OUT | 2 |
| INB | 20-May | 28.1 | OUT | 1 |
| AL | 22-May | 27.4 | IN | 0 |
| ZAA | 22-May | 27.4 | IN | 1 |
| DH | 22-May | 27.4 | IN | 0 |
| AD | 22-May | 27.4 | IN | 0 |
| INB | 22-May | 27.4 | IN | 3 |
| AL | 24-May | 30.1 | IN | 2 |
| RE | 24-May | 30.1 | IN | 0 |
| MA | 24-May | 30.1 | IN | 0 |
| ZAA | 24-May | 30.1 | IN | 0 |
| DH | 24-May | 30.1 | IN | 0 |
| AD | 24-May | 30.1 | IN | 0 |
| INB | 24-May | 30.1 | IN | 0 |
| AL | 25-May | 31 | IN | 1 |
| DH | 25-May | 31 | IN | 0 |
| INB | 25-May | 31 | IN | 1 |
| RE | 25-May | 31 | IN | 1 |
| G-ZA | 25-May | 31 | IN | 1 |
| AD | 25-May | 31 | IN | 1 |
| ZAA | 25-May | 31 | IN | 2 |
| AL | 25-May | 31.1 | IN | 0 |
| G-ZA | 25-May | 31.1 | IN | 0 |
| INB | 25-May | 31.1 | IN | 0 |
| RE | 25-May | 31.1 | IN | 0 |
| AL | 29-May | 31.9 | IN | 1 |
| G-SA | 29-May | 31.9 | IN | 2 |
| G-ZA | 29-May | 31.9 | IN | 2 |
| ZAA | 29-May | 31.9 | IN | 2 |
| RE | 29-May | 31.9 | IN | 0 |
| DH | 29-May | 31.9 | IN | 2 |
| G=AR | 29-May | 31.9 | IN | 2 |
| MA | 29-May | 31.9 | IN | 2 |
| AL | 28-Jan | 32.3 | OUT | 2 |
| G-ZA | 28-Jan | 32.3 | OUT | 1 |
| MA | 28-Jan | 32.3 | OUT | 0 |
| INB | 28-Jan | 32.3 | OUT | 0 |
| AL | 01-Jul | 31.3 | IN | 2 |
| INB | 01-Jul | 31.3 | IN | 0 |
| MA | 01-Jul | 31.3 | IN | 1 |
| RE | 01-Jul | 31.3 | IN | 0 |
| AD | 01-Jul | 31.3 | IN | 0 |
| AL | 05-Jul | 33.2 | OUT | 3 |
| G-ZA | 05-Jul | 33.2 | OUT | 1 |
| RE | 05-Jul | 33.2 | OUT | 3 |
| INB | 05-Jul | 33.2 | OUT | 3 |
| AL | 07-Jul | 34.3 | IN | 0 |
| G-ZA | 07-Jul | 34.3 | IN | 2 |
| AD | 07-Jul | 34.3 | IN | 2 |
| INB | 07-Jul | 34.3 | IN | 3 |
| RE | 07-Jul | 34.3 | IN | 3 |
| AL | 10-Jul | 34.1 | IN | 1 |
| RE | 10-Jul | 34.1 | IN | 2 |
| ZAA | 10-Jul | 34.1 | IN | 3 |
| MA | 10-Jul | 34.1 | IN | 2 |
| DH | 10-Jul | 34.1 | IN | 1 |
| AD | 10-Jul | 34.1 | IN | 1 |
| INB | 10-Jul | 34.1 | IN | 1 |
| AL | 10-Jul | 34.6 | IN | 1 |
| DH | 10-Jul | 34.6 | IN | 3 |
| AD | 10-Jul | 34.6 | IN | 2 |
| INB | 10-Jul | 34.6 | IN | 3 |
| RE | 10-Jul | 34.6 | IN | 3 |
| ZAA | 10-Jul | 34.6 | IN | 3 |
| AL | 12-Jul | 33.1 | IN | 1 |
| G-SA | 12-Jul | 33.1 | IN | 2 |
| G-ZA | 12-Jul | 33.1 | IN | 1 |
| AD | 12-Jul | 33.1 | IN | 2 |
| ZAA | 12-Jul | 33.1 | IN | 3 |
| MA | 12-Jul | 33.1 | IN | 1 |
| AL | 24-Jul | 30.8 | IN | 1 |
| ZAA | 24-Jul | 30.8 | IN | 3 |

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|---|---|---|---|---|
| KA | 05-Nov | 22.6 | IN | 0 |
| ZA | 06-Nov | 22.8 | IN | 0 |
| AR | 06-Nov | 22.8 | IN | 0 |
| SA | 06-Nov | 22.8 | IN | 1 |
| G-MA | 06-Nov | 22.8 | IN | 0 |
| G-AL | 06-Nov | 22.8 | IN | -1 |
| G-TH | 06-Nov | 22.8 | IN | 0 |
| G-HU | 06-Nov | 22.8 | IN | 0 |
| G-WA | 06-Nov | 22.8 | IN | 0 |
| AR | 07-Nov | 24.8 | IN | 1 |
| SA | 07-Nov | 24.8 | IN | 1 |
| ZA | 07-Nov | 24.8 | IN | 1 |
| G-MA | 07-Nov | 24.8 | IN | 0 |
| G-AH | 07-Nov | 24.8 | IN | 1 |
| KA | 07-Nov | 24.8 | IN | 1 |
| AR | 08-Nov | 24 | IN | 0 |
| G-MA | 08-Nov | 24 | IN | 0 |
| SA | 08-Nov | 24 | IN | 0 |
| AR | 08-Nov | 22.8 | Out | 0 |
| SA | 08-Nov | 22.8 | Out | 0 |
| G-MA | 08-Nov | 22.8 | Out | 0 |
| G-WA | 09-Nov | 23.6 | IN | 0 |
| ZA | 09-Nov | 23.6 | IN | 0 |
| G-MO | 09-Nov | 23.6 | IN | 0 |
| G-YA | 09-Nov | 23.6 | IN | 1 |
| G-MO | 09-Nov | 23.6 | IN | 0 |
| AR | 09-Nov | 23.6 | IN | 0 |
| KA | 09-Nov | 23.6 | IN | 1 |
| G-MO | 09-Nov | 23.6 | IN | 1 |
| G-EM | 09-Nov | 23.6 | IN | 0 |
| G-LU | 09-Nov | 23.6 | IN | 0 |
| G-BA | 09-Nov | 23.6 | IN | 0 |
| G-HU | 09-Nov | 23.6 | IN | 0 |
| G-SA | 09-Nov | 23.6 | IN | 0 |
| AR | 10-Nov | 21.8 | IN | -1 |
| SA | 10-Nov | 21.8 | IN | -1 |
| ZA | 10-Nov | 21.1 | IN | 0 |
| AR | 11-Nov | 21.7 | IN | 0 |
| ZA | 13-Nov | 20 | IN | -1 |
| ZA | 14-Nov | 20.2 | IN | 0 |
| AR | 15-Nov | 20 | IN | -1 |
| SA | 16-Nov | 15 | IN | -2 |
| AR | 17-Nov | 18.3 | OUT | -1 |
| ZA | 18-Nov | 18.6 | IN | -1 |
| SA | 18-Nov | 19.8 | IN | 0 |
| AR | 18-Nov | 19.8 | IN | 0 |
| KA | 18-Nov | 19.8 | IN | 0 |
| ZA | 18-Nov | 19.8 | IN | 0 |
| SA | 19-Nov | 11.5 | OUT | -1 |
| KA | 19-Nov | 11.5 | OUT | 0 |
| ZA | 20-Nov | 19.6 | IN | 0 |
| SA | 20-Nov | 22 | IN | 0 |
| G-BA | 20-Nov | 22 | IN | 0 |
| G-HU | 20-Nov | 22 | IN | 0 |
| G-YA | 20-Nov | 22 | IN | 0 |
| G-WA | 20-Nov | 22 | IN | 0 |
| G-MO | 20-Nov | 23.2 | IN | 0 |
| AR | 20-Nov | 23.2 | IN | 1 |
| ZA | 25-Nov | 21.5 | IN | 1 |
| K | 25-Nov | 21.5 | IN | 0 |
| G-HU | 25-Nov | 21.5 | IN | -1 |
| SA | 25-Nov | 21.5 | IN | 0 |
| G-AH | 25-Nov | 21.5 | IN | 0 |
| G-BA | 20-Nov | 22.2 | IN | 2 |
| G-MO | 20-Nov | 22.2 | IN | 0 |
| G-MOS | 20-Nov | 22.2 | IN | 0 |
| G-YA | 20-Nov | 22.2 | IN | 0 |
| G-HU | 20-Nov | 22.2 | IN | 0 |
| G-WA | 20-Nov | 22.2 | IN | 0 |
| G-MO | 20-Nov | 22.2 | IN | 0 |
| G-BA | 21-Nov | 24.6 | IN | 0 |
| G-YA | 21-Nov | 22.4 | IN | 0 |
| G-BA | 21-Nov | 22.2 | IN | -1 |
| G-MO | 21-Nov | 22.2 | IN | -1 |
| G-YA | 21-Nov | 22.2 | IN | -1 |
| G-HU | 21-Nov | 22.1 | IN | -1 |
| G-YA | 21-Nov | 22.1 | IN | 0 |
| G-WA | 21-Nov | 22.1 | IN | -1 |
| G-BA | 23-Nov | 19.8 | IN | -1 |
| G-MO | 23-Nov | 19.8 | IN | -1 |
| G-WA | 23-Nov | 19.8 | IN | -1 |
| G-HU | 23-Nov | 19.8 | IN | -1 |
| G-WA | 23-Nov | 19.1 | IN | -2 |
| G-HU | 23-Nov | 19.1 | IN | -1 |
| G-MO | 23-Nov | 19.1 | IN | -1 |
| G-MOS | 23-Nov | 19.1 | IN | 0 |
| G-BA | 23-Nov | 19.1 | IN | -1 |
| G-MO | 23-Nov | 20.4 | IN | 0 |
| G-MOS | 24-Nov | 18.4 | IN | -1 |
| G-HU | 24-Nov | 18.4 | IN | -1 |
| G-YA | 24-Nov | 18.4 | IN | 1 |
| G-MOS | 24-Nov | 18.4 | IN | 0 |
| G-WA | 24-Nov | 18.4 | IN | -2 |
| G-MOS | 24-Nov | 18.4 | IN | -1 |
| G-BA | 24-Nov | 18.4 | IN | -1 |
| G-MO | 25-Nov | 18.2 | IN | 0 |
| G-BA | 25-Nov | 18.2 | IN | 0 |
| G-YA | 25-Nov | 18.2 | IN | 0 |
| G-BA | 26-Nov | 15.4 | IN | -2 |
| G-YA | 26-Nov | 15.4 | IN | -2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G-AB** | 10-Jul | 31.5 | OUT | 3 | AD | 24-Jul | 30.8 | IN | 0 | G-MO | 26-Nov | 15.4 | IN | -2 |
| **YA** | 10-Jul | 31.5 | OUT | 1 | MA | 24-Jul | 30.8 | IN | 1 | G-BA | 28-Nov | 21.3 | IN | -1 |
| **MO** | 12-Jul | 30.1 | IN | 0 | RE | 24-Jul | 30.8 | IN | 2 | G-WA | 28-Nov | 21.3 | IN | -1 |
| **EB** | 12-Jul | 30.1 | IN | 0 | INB | 24-Jul | 30.8 | IN | 0 | G-HU | 28-Nov | 21.3 | IN | -1 |
| **YA** | 12-Jul | 30.1 | IN | 0 | MA | 04-Aug | 35.7 | IN | 1 | G-MO | 28-Nov | 21.3 | IN | 0 |
| **AL** | 12-Jul | 30.1 | IN | 1 | INB | 04-Aug | 35.7 | IN | 0 | G-YA | 28-Nov | 21.3 | IN | 0 |
| **DE** | 12-Jul | 30.1 | IN | 0 | RE | 04-Aug | 35.7 | IN | 2 | G-MOF | 30-Nov | 19.7 | IN | 0 |
| **AB** | 12-Jul | 30.1 | IN | 2 | AL | 06-Aug | 34.6 | OUT | 1 | G-SA | 30-Nov | 19.7 | IN | 0 |
| **DE** | 13-Jul | 60 | OUT | 3 | G-ZA | 06-Aug | 34.6 | OUT | 1 | G-BA | 30-Nov | 19.7 | IN | 1 |
| **YA** | 13-Jul | 60 | OUT | 3 | INB | 06-Aug | 34.6 | OUT | 2 | G-NS | 30-Nov | 19.7 | IN | 0 |
| **AB** | 13-Jul | 60 | OUT | 3 | RE | 06-Aug | 34.6 | OUT | 2 | G-HU | 30-Nov | 19.7 | IN | 1 |
| **AL** | 13-Jul | 60 | OUT | 3 | G-SA | 06-Aug | 34.6 | OUT | 1 | G-ZA | 30-Nov | 19.7 | IN | 0 |
| **G-AR** | 13-Jul | 29.1 | IN | 1 | G-KA | 06-Aug | 34.6 | OUT | 2 | G-AH | 30-Nov | 19.7 | IN | 2 |
| **G-SA** | 13-Jul | 29.1 | IN | 1 | MA | 06-Aug | 34.6 | OUT | 2 | G-KA | 30-Nov | 19.7 | IN | 2 |
| **EB** | 13-Jul | 29.1 | IN | 0 | G-AR | 06-Aug | 34.6 | OUT | 1 | G-YA | 30-Nov | 19.7 | IN | 0 |
| **MO** | 13-Jul | 29.1 | IN | 1 | G-AH | 06-Aug | 34.6 | OUT | 1 | G-MOS | 30-Nov | 19.7 | IN | -1 |
| **AB** | 13-Jul | 29.1 | IN | 1 | AL | 12-Aug | 34.6 | IN | 2 | G-YA | 03-Dec | 17.2 | IN | -1 |
| **DE** | 13-Jul | 29.1 | IN | 1 | DH | 12-Aug | 34.6 | IN | 2 | G-BA | 03-Dec | 17.2 | IN | -2 |
| **YA** | 13-Jul | 29.1 | IN | 1 | ZAA | 12-Aug | 34.6 | IN | 3 | G-AL | 04-Dec | 22.5 | IN | -1 |
| **EB** | 16-Jul | 27 | IN | 0 | RE | 12-Aug | 34.6 | IN | 2 | G-TH | 04-Dec | 22.5 | IN | 0 |
| **AL** | 16-Jul | 27 | IN | 0 | AD | 12-Aug | 34.6 | IN | 2 | G-AL | 14-Dec | 17.8 | IN | 0 |
| **YA** | 16-Jul | 27 | IN | 0 | INB | 12-Aug | 34.6 | IN | 3 | AR | 14-Dec | 17.8 | IN | 0 |
| **AN** | 16-Jul | 27 | IN | 0 | AL | 13-Aug | 34.1 | IN | 1 | G-RE | 14-Dec | 17.8 | IN | 0 |
| **DE** | 16-Jul | 27 | IN | 0 | DH | 13-Aug | 34.1 | IN | 2 | G-AH | 14-Dec | 17.8 | IN | 0 |
| **G-SIN** | 20-Jul | 28.8 | IN | 0 | INB | 13-Aug | 34.1 | IN | 2 | G-AH2 | 14-Dec | 17.8 | IN | 0 |
| **G-RE** | 20-Jul | 28.8 | IN | 0 | RE | 13-Aug | 34.1 | IN | 2 | KA | 25-Dec | 17.2 | IN | 0 |
| **G-DA** | 20-Jul | 28.8 | IN | 1 | AD | 13-Aug | 34.1 | IN | 2 | AR | 25-Dec | 17.2 | IN | 0 |
| **G-HA** | 20-Jul | 28.8 | IN | 1 | ZAA | 13-Aug | 34.1 | IN | 3 | G-MA | 25-Dec | 17.2 | IN | 0 |
| **EB** | 20-Jul | 28.8 | IN | 1 | AL | 18-Aug | 33.8 | IN | 2 | KA | 27-Dec | 15.9 | IN | -1 |
| **DE** | 20-Jul | 28.8 | IN | 0 | RE | 18-Aug | 33.8 | IN | 2 | AR | 27-Dec | 15.9 | IN | -1 |
| **MO** | 20-Jul | 28.8 | IN | 1 | ZAA | 18-Aug | 33.8 | IN | 2 | G-AH | 27-Dec | 15.9 | IN | -1 |
| **YA** | 20-Jul | 28.8 | IN | 0 | INB | 18-Aug | 33.8 | IN | 3 | KA | 28-Dec | 10.4 | OUT | -2 |
| **G-SA** | 20-Jul | 28.8 | IN | 2 | MA | 18-Aug | 33.8 | IN | 1 | AR | 28-Dec | 10.4 | OUT | -2 |
| **G-SIN** | 21-Jul | 30 | OUT | 0 | AD | 18-Aug | 33.8 | IN | 2 | G-AH | 28-Dec | 10.4 | OUT | -1 |
| **G-RE** | 21-Jul | 30 | OUT | 0 | DH | 18-Aug | 33.8 | IN | 2 | KA | 28-Dec | 15.3 | IN | 0 |
| **G-AB** | 21-Jul | 30 | OUT | 2 | AL | 21-Aug | 31.2 | IN | 0 | AR | 28-Dec | 15.3 | IN | 0 |
| **G-MOS2** | 21-Jul | 30 | OUT | 2 | AD | 21-Aug | 31.2 | IN | 0 | KA | 29-Dec | 17.4 | IN | 1 |
| **G-GH** | 21-Jul | 30 | OUT | 0 | ZAA | 21-Aug | 31.2 | IN | 2 | AR | 29-Dec | 17.4 | IN | 0 |
| **EB** | 23-Jul | 28.3 | IN | 0 | G-AH | 21-Aug | 31.2 | IN | 0 | G-AH | 29-Dec | 17.4 | IN | 0 |
| **AL** | 23-Jul | 28.3 | IN | 0 | DH | 21-Aug | 31.2 | IN | 2 | G-HU | 29-Dec | 17.4 | IN | -1 |
| **MO** | 23-Jul | 28.3 | IN | 0 | RE | 21-Aug | 31.2 | IN | 0 | G-WA | 29-Dec | 17.4 | IN | -1 |
| **DE** | 23-Jul | 28.3 | IN | 0 | AL | 26-Aug | 34 | OUT | 2 | KA | 30-Dec | 18.1 | IN | 2 |
| **AB** | 23-Jul | 28.3 | IN | 1 | G-ZA | 26-Aug | 34 | OUT | 1 | AR | 30-Dec | 18.1 | IN | 0 |
| **G-AM** | 24-Jul | 28.2 | IN | 0 | INB | 26-Aug | 34 | OUT | 2 | G-AH | 30-Dec | 18.1 | IN | 0 |
| **G-SA2** | 24-Jul | 28.2 | IN | 0 | DH | 26-Aug | 34 | OUT | 3 | G-HU | 30-Dec | 18.1 | IN | 0 |
| **G-MA** | 24-Jul | 28.2 | IN | 0 | AD | 26-Aug | 34 | OUT | 2 | G-WA | 30-Dec | 18.1 | IN | -2 |
| **G-RU** | 24-Jul | 28.2 | IN | 0 | AL | 31-Aug | 31.4 | IN | 0 | KA | 31-Dec | 17.9 | IN | 0 |
| **G-WA** | 24-Jul | 28.2 | IN | 0 | RE | 31-Aug | 31.4 | IN | 0 | AR | 31-Dec | 17.9 | IN | 0 |
| **YA** | 24-Jul | 28.2 | IN | 0 | AD | 31-Aug | 31.4 | IN | 0 | G-AH | 31-Dec | 17.9 | IN | 0 |
| **EB** | 24-Jul | 28.2 | IN | 0 | G-ZA | 31-Aug | 31.4 | IN | 0 | KA | 02-Jan | 15.8 | IN | -1 |
| **AB** | 24-Jul | 28.2 | IN | 0 | MA | 31-Aug | 31.4 | IN | 0 | AR | 02-Jan | 15.8 | IN | -2 |
| **DE** | 24-Jul | 28.2 | IN | 0 | INB | 31-Aug | 31.4 | IN | 0 | G-AH 2 | 02-Jan | 15.8 | IN | -1 |
| **EB** | 26-Jul | 25.1 | IN | -1 | ZAA | 31-Aug | 31.4 | IN | 0 | G-AH | 02-Jan | 15.8 | IN | -1 |
| **MO** | 26-Jul | 25.1 | IN | 0 | AL | 01-Sep | 31.7 | OUT | 0 | G-MA | 02-Jan | 15.8 | IN | -1 |
| **DE** | 26-Jul | 25.1 | IN | 0 | G-ZA | 01-Sep | 31.7 | OUT | 0 | KA | 05-Jan | 17.7 | IN | 0 |
| **EB** | 27-Jul | 24.6 | IN | -1 | RE | 01-Sep | 31.7 | OUT | 0 | AR | 05-Jan | 17.7 | IN | -1 |
| **DE** | 27-Jul | 24.6 | IN | -1 | INB | 01-Sep | 31.7 | OUT | 1 | G-AH | 05-Jan | 17.7 | IN | -1 |
| **EB** | 29-Jul | 27.8 | IN | 0 | MA | 01-Sep | 31.7 | OUT | 0 | KA | 06-Jan | 16.2 | IN | -1 |
| **MO** | 29-Jul | 27.8 | IN | 0 | AL | 04-Sep | 32.3 | IN | 3 | AR | 06-Jan | 16.2 | IN | -1 |
| **DE** | 29-Jul | 27.8 | IN | 0 | ZAA | 04-Sep | 32.3 | IN | 2 | G-AH | 06-Jan | 16.2 | IN | -1 |
| **EB** | 29-Jul | 28.7 | IN | 0 | AD | 04-Sep | 32.3 | IN | 2 | KA | 07-Jan | 16.7 | OUT | -1 |
| **MO** | 29-Jul | 28.7 | IN | 0 | RE | 04-Sep | 32.3 | IN | 2 | AR | 07-Jan | 16.7 | OUT | -2 |
| **DE** | 29-Jul | 28.7 | IN | 0 | INB | 04-Sep | 32.3 | IN | 2 | G-AH | 07-Jan | 16.7 | OUT | -1 |
| **EB** | 02-Aug | 27 | IN | 0 | DH | 04-Sep | 32.3 | IN | 3 | KA | 07-Jan | 15.2 | IN | -1 |
| **AL** | 02-Aug | 27 | IN | 0 | AL | 05-Sep | 31.7 | IN | 0 | AR | 07-Jan | 15.2 | IN | -1 |
| **AB** | 02-Aug | 27 | IN | 0 | G-ZA | 05-Sep | 31.7 | IN | 1 | G-AH | 07-Jan | 15.2 | IN | -1 |
| **DE** | 02-Aug | 27 | IN | 0 | IN | 05-Sep | 31.7 | IN | 2 | KA | 08-Jan | 14.7 | IN | 0 |
| **EB** | 04-Aug | 29.1 | IN | 1 | ZAA | 05-Sep | 31.7 | IN | 2 | AR | 08-Jan | 14.7 | IN | -1 |
| **AL** | 04-Aug | 29.1 | IN | 0 | AD | 05-Sep | 31.7 | IN | 0 | G-AH | 08-Jan | 14.7 | IN | -1 |
| **MO** | 04-Aug | 29.1 | IN | 0 | G-SA | 05-Sep | 31.7 | IN | 2 | AR | 09-Jan | 20.3 | OUT | 0 |
| **DE** | 04-Aug | 29.1 | IN | 0 | G-KA | 05-Sep | 31.7 | IN | 2 | KA | 09-Jan | 15.8 | IN | -1 |
| **AB** | 04-Aug | 29.1 | IN | 0 | G-AR | 05-Sep | 31.7 | IN | 1 | AR | 09-Jan | 15.8 | IN | -1 |
| **EB** | 05-Aug | 28.7 | IN | 0 | AL | 11-Sep | 32 | IN | 0 | G-AH | 09-Jan | 15.8 | IN | -1 |
| **AL** | 05-Aug | 28.7 | IN | 0 | AD | 11-Sep | 32 | IN | 2 | KA | 15-Jan | 13.7 | IN | 0 |
| **AB** | 05-Aug | 28.7 | IN | 0 | ZAA | 11-Sep | 32 | IN | 2 | AR | 15-Jan | 13.7 | IN | 0 |
| **DE** | 05-Aug | 28.7 | IN | 1 | DH | 11-Sep | 32 | IN | 2 | AG-AH | 15-Jan | 13.7 | IN | 0 |
| **G-GH** | 06-Aug | 26 | IN | 0 | MA | 11-Sep | 32 | IN | 2 | KA | 17-Jan | 13.2 | IN | 0 |
| **EB** | 06-Aug | 26 | IN | 0 | AL | 12-Sep | 28.6 | OUT | 0 | A | 17-Jan | 13.2 | IN | -1 |
| **AL** | 06-Aug | 26 | IN | 0 | AD | 12-Sep | 28.6 | OUT | 0 | G-AH | 17-Jan | 13.2 | IN | 0 |
| **MO** | 06-Aug | 26 | IN | 0 | DH | 12-Sep | 28.6 | OUT | 0 | G-AH 2 | 17-Jan | 13.2 | IN | 0 |
| **DE** | 06-Aug | 26 | IN | 0 | MA | 12-Sep | 28.6 | OUT | 0 | KA | 21-Jan | 16.1 | IN | 0 |
| **AN** | 06-Aug | 26 | IN | 0 | AL | 21-Sep | 30.3 | IN | 1 | A | 21-Jan | 16.1 | IN | 0 |
| **DE** | 07-Aug | 61.4 | OUT | 3 | INB | 21-Sep | 30.3 | IN | 0 | KA | 22-Jan | 15.7 | IN | 0 |
| **MO** | 07-Aug | 61.4 | OUT | 3 | G-ZA | 21-Sep | 30.3 | IN | 0 | AR | 22-Jan | 15.7 | IN | 0 |
| **AB** | 07-Aug | 61.4 | OUT | 3 | MA | 21-Sep | 30.3 | IN | 0 | G-AH 2 | 22-Jan | 15.7 | IN | 0 |
| **EB** | 07-Aug | 61.4 | OUT | 3 | AD | 21-Sep | 30.3 | IN | 0 | AR | 24-Jan | 18.9 | OUT | 0 |
| **G-AR** | 08-Aug | 43.1 | OUT | 3 | AL | 21-Sep | 27 | OUT | 0 | G-MA | 24-Jan | 18.9 | OUT | -1 |
| **G-SA** | 08-Aug | 43.1 | OUT | 3 | INB | 21-Sep | 27 | OUT | 1 | SA | 24-Jan | 18.9 | OUT | -1 |
| **G-KA** | 08-Aug | 43.1 | OUT | 3 | G-ZA | 21-Sep | 27 | OUT | 1 | AR | 25-Jan | 17.7 | IN | 0 |
| **G-AR** | 08-Aug | 26.9 | IN | 0 | MA | 21-Sep | 27 | OUT | 1 | ZA | 25-Jan | 17.7 | IN | 0 |
| **G-SA** | 08-Aug | 26.9 | IN | 1 | AL | 23-Jan | 32.5 | IN | 3 | SA | 25-Jan | 17.7 | IN | 0 |
| **G-KA** | 08-Aug | 26.9 | IN | 0 | RE | 23-Jan | 32.5 | IN | 3 | KA | 25-Jan | 17.7 | IN | 0 |
| **DE** | 08-Aug | 26.9 | IN | 0 | ZAA | 23-Jan | 32.5 | IN | 2 | AR | 27-Jan | 15.1 | IN | 0 |
| **MO** | 08-Aug | 26.9 | IN | 0 | DH | 23-Jan | 32.5 | IN | 1 | SA | 27-Jan | 15.1 | IN | -1 |
| **EB** | 08-Aug | 26.9 | IN | 0 | AD | 23-Jan | 32.5 | IN | 0 | KA | 27-Jan | 15.1 | IN | 1 |
| **DE** | 10-Aug | 72.8 | OUT | 3 | INB | 23-Jan | 32.5 | IN | 2 | AR | 01-Feb | 14.8 | IN | 0 |
| **EB** | 10-Aug | 72.8 | OUT | 3 | MA | 23-Jan | 32.5 | IN | 2 | SA | 01-Feb | 14.8 | IN | 0 |
| **AB** | 10-Aug | 72.8 | OUT | 3 | AL | 24-Jan | 27.4 | OUT | 0 | KA | 01-Feb | 14.8 | IN | 1 |
| **YA** | 10-Aug | 72.8 | OUT | 3 | MA | 24-Jan | 27.4 | OUT | 0 | AR | 02-Feb | 11.8 | OUT | -3 |
| **EB** | 12-Aug | 25 | IN | 0 | INB | 24-Jan | 27.4 | OUT | 0 | SA | 02-Feb | 11.8 | OUT | -3 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **YA** | 12-Aug | 25 | IN | 0 | RE | 24-Jan | 27.4 | OUT | 0 | KA | 02-Feb | 11.8 | OUT | -2 |
| **DE** | 12-Aug | 25 | IN | 0 | ZAA | 24-Jan | 27.4 | OUT | 0 | KA | 03-Feb | 18.4 | IN | 1 |
| **AB** | 12-Aug | 25 | IN | 0 | AL | 27-Jan | 31.3 | IN | 0 | AR | 03-Feb | 18.4 | IN | 0 |
| **DE** | 14-Aug | 68.8 | OUT | 3 | INB | 27-Jan | 31.3 | IN | 1 | G-INB | 03-Feb | 18.4 | IN | -1 |
| **AB** | 14-Aug | 68.8 | OUT | 3 | G-ZA | 27-Jan | 31.3 | IN | 1 | SA | 03-Feb | 18.4 | IN | -2 |
| **YA** | 14-Aug | 68.8 | OUT | 3 | MA | 27-Jan | 31.3 | IN | 2 | G-AL | 03-Feb | 18.4 | IN | -1 |
| **EB** | 14-Aug | 68.8 | OUT | 3 | ZAA | 27-Jan | 31.3 | IN | 2 | AR | 04-Feb | 17.4 | OUT | 0 |
| **G-MOS** | 15-Aug | 27.5 | IN | 2 | DH | 27-Jan | 31.3 | IN | 2 | SA | 04-Feb | 17.4 | OUT | 0 |
| **G-RU** | 15-Aug | 27.5 | IN | 2 | AD | 27-Jan | 31.3 | IN | 0 | KA | 04-Feb | 17.4 | OUT | 0 |
| **YA** | 15-Aug | 27.5 | IN | 0 | AL | 11-Oct | 26.4 | OUT | 0 | G-INB | 04-Feb | 17.4 | OUT | 0 |
| **EB** | 15-Aug | 27.5 | IN | 0 | RE | 11-Oct | 26.4 | OUT | 0 | G-AL | 04-Feb | 17.4 | OUT | 0 |
| **DE** | 15-Aug | 27.5 | IN | 0 | G-KA | 11-Oct | 26.4 | OUT | 0 | AR | 05-Feb | 17 | IN | 0 |
| **AB** | 15-Aug | 27.5 | IN | 0 | G-ZA | 11-Oct | 26.4 | OUT | 0 | SA | 05-Feb | 17 | IN | 1 |
| **EB** | 16-Aug | 27.6 | IN | 0 | INB | 11-Oct | 26.4 | OUT | 0 | G-AH | 05-Feb | 17 | IN | 0 |
| **YA** | 16-Aug | 27.6 | IN | 0 | DH | 11-Oct | 26.4 | OUT | 0 | G-AL | 05-Feb | 17 | IN | -1 |
| **DE** | 16-Aug | 27.6 | IN | 0 | G-AR | 11-Oct | 26.4 | OUT | 0 | G-HU | 05-Feb | 17 | IN | -1 |
| **AB** | 16-Aug | 27.6 | IN | 0 | ZAA | 11-Oct | 26.4 | OUT | 1 | G-KA | 05-Feb | 17 | IN | 2 |
| **EB** | 17-Aug | 70.1 | OUT | 3 | AL | 13-Oct | 26.3 | OUT | 0 | G-WA | 05-Feb | 17 | IN | 0 |
| **YA** | 17-Aug | 70.1 | OUT | 3 | AD | 13-Oct | 26.3 | OUT | 0 | G-INB | 05-Feb | 17 | IN | 0 |
| **AB** | 17-Aug | 70.1 | OUT | 3 | DH | 13-Oct | 26.3 | OUT | 1 | G-MA | 05-Feb | 17 | IN | 0 |
| **DE** | 17-Aug | 70.1 | OUT | 3 | G-AR | 13-Oct | 26.3 | OUT | 1 | G-AH | 05-Feb | 17 | IN | 0 |
| **G-WA** | 17-Aug | 27.2 | IN | 0 | G-SA | 13-Oct | 26.3 | OUT | 0 | G-AL | 06-Feb | 18.4 | IN | 0 |
| **G-MOS** | 17-Aug | 27.2 | IN | 0 | G-KA | 13-Oct | 26.3 | OUT | 1 | G-INB | 06-Feb | 18.4 | IN | 0 |
| **G-RU** | 17-Aug | 27.2 | IN | 0 | G-ZA | 13-Oct | 26.3 | OUT | 0 | G-WA | 06-Feb | 18.4 | IN | -1 |
| **YA** | 17-Aug | 27.2 | IN | 0 | INB | 13-Oct | 26.3 | OUT | 0 | G-HU | 06-Feb | 18.4 | IN | -1 |
| **EB** | 17-Aug | 27.2 | IN | 0 | ZAA | 13-Oct | 26.3 | OUT | 2 | G-AH | 06-Feb | 18.4 | IN | 0 |
| **DE** | 17-Aug | 27.2 | IN | 0 | RE | 13-Oct | 26.3 | OUT | 2 | G-MA | 06-Feb | 18.4 | IN | -1 |
| **AB** | 17-Aug | 27.2 | IN | 0 | MA | 13-Oct | 26.3 | OUT | 0 | G-AH 2 | 06-Feb | 18.4 | IN | 0 |
| **G-MOS** | 18-Aug | 32.6 | OUT | 1 | AL | 14-Oct | 27.9 | IN | 0 | G-AL | 07-Feb | 15.8 | IN | -1 |
| **G-RU** | 18-Aug | 32.6 | OUT | 0 | DH | 14-Oct | 27.9 | IN | -1 | G-INB | 07-Feb | 15.8 | IN | 0 |
| **G-WA** | 18-Aug | 32.6 | OUT | 2 | INB | 14-Oct | 27.9 | IN | 0 | G-MA | 07-Feb | 15.8 | IN | -3 |
| **YA** | 18-Aug | 32.6 | OUT | 1 | RE | 14-Oct | 27.9 | IN | 0 | G-WA | 07-Feb | 15.8 | IN | -2 |
| **G-NA** | 21-Aug | 28.8 | IN | 0 | MA | 14-Oct | 27.9 | IN | 0 | G-HU | 07-Feb | 15.8 | IN | 0 |
| **G-OM** | 21-Aug | 28.8 | IN | 1 | AL | 15-Oct | 26.9 | IN | 0 | G-AH | 07-Feb | 15.8 | IN | 0 |
| **G-SIN** | 21-Aug | 28.8 | IN | 1 | ZAA | 15-Oct | 26.9 | IN | 2 | G-MA | 13-Feb | 17.6 | IN | 0 |
| **G-AH** | 21-Aug | 28.8 | IN | 2 | DH | 15-Oct | 26.9 | IN | -1 | SA | 13-Feb | 17.6 | IN | -1 |
| **G-MOS2** | 21-Aug | 28.8 | IN | 1 | AD | 15-Oct | 26.9 | IN | 0 | AR | 13-Feb | 17.6 | IN | -1 |
| **G-AB** | 21-Aug | 28.8 | IN | 1 | RE | 15-Oct | 26.9 | IN | 0 | G-AH | 13-Feb | 17.6 | IN | -1 |
| **G-GH** | 21-Aug | 28.8 | IN | 0 | INB | 15-Oct | 26.9 | IN | 0 | SA | 13-Feb | 17.6 | IN | -2 |
| **G-ALA** | 21-Aug | 28.8 | IN | 1 | AL | 16-Oct | 26.2 | OUT | 0 | KA | 13-Feb | 14.1 | OUT | -2 |
| **G-RE** | 21-Aug | 28.8 | IN | 1 | AD | 16-Oct | 26.2 | OUT | 0 | AR | 13-Feb | 14.1 | OUT | -2 |
| **G-RA** | 21-Aug | 28.8 | IN | 2 | DH | 16-Oct | 26.2 | OUT | 0 | G-AH | 13-Feb | 14.1 | OUT | -3 |
| **G-NA** | 21-Aug | 43.1 | OUT | 3 | G-ZA | 16-Oct | 26.2 | OUT | 0 | SA | 13-Feb | 14.1 | OUT | -3 |
| **G-SIN** | 21-Aug | 43.1 | OUT | 3 | RE | 16-Oct | 26.2 | OUT | 0 | AR | 14-Feb | 16.8 | OUT | -1 |
| **G-RE** | 21-Aug | 43.1 | OUT | 3 | AL | 17-Oct | 27.8 | IN | 2 | KA | 14-Feb | 16.8 | OUT | 0 |
| **G-AH** | 21-Aug | 43.1 | OUT | 3 | ZAA | 17-Oct | 27.8 | IN | 2 | SA | 14-Feb | 16.8 | OUT | -2 |
| **G-GH** | 21-Aug | 43.1 | OUT | 3 | MA | 17-Oct | 27.8 | IN | 2 | G-AH | 14-Feb | 16.8 | OUT | -1 |
| **G-AB** | 21-Aug | 43.1 | OUT | 3 | AL | 18-Oct | 27.3 | IN | 1 | AR | 16-Feb | 19.4 | IN | 0 |
| **G-RA** | 21-Aug | 43.1 | OUT | 3 | ZAA | 18-Oct | 27.3 | IN | 2 | SA | 16-Feb | 19.4 | IN | 0 |
| **AL** | 21-Aug | 43.1 | OUT | 3 | RE | 18-Oct | 27.3 | IN | 2 | KA | 16-Feb | 19.4 | IN | 0 |
| **YA** | 21-Aug | 43.1 | OUT | 3 | MA | 18-Oct | 27.3 | IN | 0 | AR | 17-Feb | 17.7 | IN | 0 |
| **G-WA** | 22-Aug | 25.9 | IN | 0 | AL | 19-Oct | 27.4 | IN | 0 | KA | 17-Feb | 17.7 | IN | -1 |
| **G-MOS** | 22-Aug | 25.9 | IN | 0 | RE | 19-Oct | 27.4 | IN | 0 | SA | 17-Feb | 17.7 | IN | 0 |
| **G-RU** | 22-Aug | 25.9 | IN | 1 | AD | 19-Oct | 27.4 | IN | 0 | G-AL | 19-Feb | 22.2 | IN | 0 |
| **AL** | 22-Aug | 25.9 | IN | 0 | DH | 19-Oct | 27.4 | IN | 0 | G-AH | 19-Feb | 22.2 | IN | 0 |
| **YA** | 22-Aug | 25.9 | IN | 0 | INB | 19-Oct | 27.4 | IN | 1 | G-WA | 19-Feb | 22.2 | IN | 0 |
| **DE** | 22-Aug | 25.9 | IN | 0 | AL | 20-Oct | 27.8 | IN | 0 | G-HU | 19-Feb | 22.2 | IN | 0 |
| **EB** | 22-Aug | 25.9 | IN | 0 | MA | 20-Oct | 27.8 | IN | 0 | SA | 19-Feb | 22.2 | IN | 0 |
| **G-SIN** | 23-Aug | 30.8 | IN | 1 | ZAA | 20-Oct | 27.8 | IN | 1 | KA | 19-Feb | 22.2 | IN | 1 |
| **G-RE** | 23-Aug | 30.8 | IN | 0 | DH | 20-Oct | 27.8 | IN | 0 | AR | 19-Feb | 22.2 | IN | 0 |
| **G-GH** | 23-Aug | 30.8 | IN | 0 | RE | 20-Oct | 27.8 | IN | 0 | AR | 20-Feb | 17.9 | OUT | 0 |
| **G-RA** | 23-Aug | 30.8 | IN | 0 | AD | 20-Oct | 27.8 | IN | 0 | SA | 20-Feb | 17.9 | OUT | -1 |
| **YA** | 23-Aug | 30.8 | IN | 1 | AL | 21-Oct | 24.4 | IN | 0 | G-AL | 20-Feb | 17.9 | OUT | 0 |
| **EB** | 23-Aug | 30.8 | IN | 1 | MA | 21-Oct | 24.4 | IN | -2 | AR | 22-Feb | 19.2 | IN | 0 |
| **G-SIN** | 25-Aug | 33.7 | OUT | 0 | ZAA | 21-Oct | 24.4 | IN | -2 | KA | 22-Feb | 19.2 | IN | 0 |
| **G-RE** | 25-Aug | 33.7 | OUT | 0 | RE | 21-Oct | 24.4 | IN | 0 | SA | 22-Feb | 19.2 | IN | -2 |
| **G-RA** | 25-Aug | 33.7 | OUT | 0 | AL | 22-Oct | 24.3 | IN | 1 | AR | 24-Feb | 14.9 | OUT | -1 |
| **G-MOS2** | 25-Aug | 33.7 | OUT | 2 | MA | 22-Oct | 24.3 | IN | 0 | SA | 24-Feb | 14.9 | OUT | -2 |
| **G-AB** | 25-Aug | 33.7 | OUT | 1 | ZAA | 22-Oct | 24.3 | IN | -2 | KA | 24-Feb | 14.9 | OUT | 0 |
| **YA** | 25-Aug | 33.7 | OUT | 0 | DH | 22-Oct | 24.3 | IN | -2 | AR | 25-Feb | 19.4 | IN | 0 |
| **DE** | 26-Aug | 58 | IN | 3 | AD | 22-Oct | 24.3 | IN | 0 | SA | 25-Feb | 19.4 | IN | 0 |
| **EB** | 26-Aug | 58 | IN | 3 | AL | 24-Oct | 24.2 | IN | 0 | G-MA | 25-Feb | 19.4 | IN | 0 |
| **AB** | 26-Aug | 58 | IN | 3 | AD | 24-Oct | 24.2 | IN | 0 | AR | 26-Feb | 21 | IN | 1 |
| **AL** | 26-Aug | 58 | IN | 3 | ZAA | 24-Oct | 24.2 | IN | -2 | M | 26-Feb | 21 | IN | 0 |
| **YA** | 26-Aug | 58 | IN | 3 | DH | 24-Oct | 24.2 | IN | 0 | SA | 26-Feb | 21 | IN | 1 |
| **G-WA** | 26-Aug | 30.9 | IN | 2 | INB | 24-Oct | 24.2 | IN | 0 | KA | 26-Feb | 21 | IN | 0 |
| **G-MOS** | 26-Aug | 30.9 | IN | 1 | RE | 24-Oct | 24.2 | IN | 0 | AR | 28-Feb | 19 | IN | 0 |
| **G-RU** | 26-Aug | 30.9 | IN | 2 | AL | 26-Oct | 22.7 | IN | 0 | G-AH | 28-Feb | 19 | IN | 0 |
| **AB** | 26-Aug | 30.9 | IN | 2 | RE | 26-Oct | 22.7 | IN | 0 | SA | 28-Feb | 19 | IN | 0 |
| **YA** | 26-Aug | 30.9 | IN | 1 | AD | 26-Oct | 22.7 | IN | 0 | KA | 28-Feb | 19 | IN | 1 |
| **AL** | 26-Aug | 30.9 | IN | 1 | ZAA | 26-Oct | 22.7 | IN | -2 | SA | 03-Mar | 19.8 | IN | 0 |
| **DE** | 26-Aug | 30.9 | IN | 1 | INB | 26-Oct | 22.7 | IN | 0 | KA | 03-Mar | 19.8 | IN | 1 |
| **G-SIN** | 27-Aug | 25.3 | IN | 0 | MA | 26-Oct | 22.7 | IN | 0 | G-HU | 03-Mar | 19.8 | IN | 0 |
| **G-RE** | 27-Aug | 25.3 | IN | 0 | AL | 27-Oct | 21.3 | IN | 1 | G-WA | 03-Mar | 19.8 | IN | 0 |
| **G-RA** | 27-Aug | 25.3 | IN | 0 | RE | 27-Oct | 21.3 | IN | 0 | SA | 05-Mar | 21.9 | IN | 2 |
| **YA** | 27-Aug | 25.3 | IN | 0 | AD | 27-Oct | 21.3 | IN | 0 | SA | 11-Mar | 31.2 | OUT | 0 |
| **AL** | 27-Aug | 25.3 | IN | 0 | G-RA | 27-Oct | 21.3 | IN | 0 | G-MA | 11-Mar | 31.2 | OUT | 0 |
| **EB** | 27-Aug | 25.3 | IN | 0 | G-WE | 27-Oct | 21.3 | IN | 0 | AR | 11-Mar | 31.2 | OUT | 0 |
| **DE** | 27-Aug | 25.3 | IN | 0 | DH | 27-Oct | 21.3 | IN | 0 | KA | 11-Mar | 31.2 | OUT | 0 |
| **G-SIN** | 28-Aug | 31.5 | OUT | 0 | ZAA | 27-Oct | 21.3 | IN | 0 | KA | 14-Mar | 22.5 | IN | 0 |
| **G-RE** | 28-Aug | 31.5 | OUT | 0 | AL | 28-Oct | 24.1 | IN | 1 | SA | 14-Mar | 22.5 | IN | 0 |
| **G-MOS2** | 28-Aug | 31.5 | OUT | 0 | RE | 28-Oct | 24.1 | IN | 0 | AR | 14-Mar | 22.5 | IN | 0 |
| **G-RA** | 28-Aug | 31.5 | OUT | 0 | INB | 28-Oct | 24.1 | IN | 1 | AR | 16-Mar | 22.5 | IN | 0 |
| **G-AB** | 28-Aug | 31.5 | OUT | 0 | AD | 28-Oct | 24.1 | IN | 0 | SA | 16-Mar | 22.5 | IN | 0 |
| **AL** | 28-Aug | 31.5 | OUT | 1 | G-ZA | 28-Oct | 24.1 | IN | 1 | KA | 16-Mar | 22.5 | IN | 1 |
| **AB** | 28-Aug | 31.5 | OUT | 0 | G-AR | 28-Oct | 24.1 | IN | 1 | SA | 16-Mar | 17.4 | OUT | -1 |
| **YA** | 28-Aug | 31.5 | OUT | 1 | DH | 28-Oct | 24.1 | IN | 1 | AR | 16-Mar | 17.4 | OUT | -1 |
| **DE** | 28-Aug | 31.5 | OUT | 1 | AL | 28-Oct | 22.9 | IN | 0 | SA | 20-Mar | 21.6 | IN | 0 |
| **G-SIN** | 31-Aug | 28 | IN | 1 | ZAA | 28-Oct | 22.9 | IN | -2 | ZA | 20-Mar | 21.6 | IN | 0 |
| **G-RE** | 31-Aug | 28 | IN | 1 | AL | 30-Oct | 27.3 | IN | 0 | G-MA | 20-Mar | 21.6 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AL** | 31-Aug | 28 | IN | 1 | RE | 30-Oct | 27.3 | IN | 0 | AR | 20-Mar | 21.6 | IN | 0 |
| **YA** | 31-Aug | 28 | IN | 0 | ZAA | 30-Oct | 27.3 | IN | -2 | KA | 20-Mar | 21.6 | IN | 0 |
| **EB** | 31-Aug | 28 | IN | 0 | INB | 30-Oct | 27.3 | IN | 0 | KA | 01-Apr | 22.4 | IN | 0 |
| **G-SIN** | 31-Aug | 30.6 | OUT | 1 | AD | 30-Oct | 27.3 | IN | 0 | AR | 01-Apr | 22.4 | IN | 0 |
| **G-RE** | 31-Aug | 30.6 | OUT | 1 | G-AR | 30-Oct | 27.3 | IN | 0 | SA | 01-Apr | 22.4 | IN | 0 |
| **G-RA** | 31-Aug | 30.6 | OUT | 0 | G-GH | 30-Oct | 27.3 | IN | 0 | G-MA | 01-Apr | 22.4 | IN | 0 |
| **YA** | 31-Aug | 30.6 | OUT | 0 | G-EN | 30-Oct | 27.3 | IN | 0 | SA | 08-Apr | 26.8 | IN | 1 |
| **AL** | 31-Aug | 30.6 | OUT | 1 | AL | 01-Nov | 23.2 | IN | 0 | G-WA | 08-Apr | 26.8 | IN | 0 |
| **G-NA** | 31-Aug | 29.4 | IN | 0 | RE | 01-Nov | 23.2 | IN | 0 | G-HU | 08-Apr | 26.8 | IN | 0 |
| **G-ALA** | 31-Aug | 29.4 | IN | 0 | MA | 01-Nov | 23.2 | IN | 0 | SA | 09-Apr | 26.9 | IN | 2 |
| **G-AB** | 31-Aug | 29.4 | IN | 2 | AL | 02-Nov | 25.4 | IN | 0 | G-WA | 09-Apr | 26.9 | IN | 1 |
| **AL** | 31-Aug | 29.4 | IN | 0 | INB | 02-Nov | 25.4 | IN | 1 | G-HU | 09-Apr | 26.9 | IN | 1 |
| **YA** | 31-Aug | 29.4 | IN | 0 | ZAA | 02-Nov | 25.4 | IN | -2 | KA | 09-Apr | 26.9 | IN | 1 |
| **AB** | 31-Aug | 29.4 | IN | 1 | AD | 02-Nov | 25.4 | IN | 0 | G-MA | 09-Apr | 26.9 | IN | 0 |
| **AB** | 31-Aug | 29.4 | IN | 0 | MA | 02-Nov | 25.4 | IN | 0 | MO | 27-Jan | 16.5 | OUT | -1 |
| **DE** | 31-Aug | 29.4 | IN | 0 | RE | 02-Nov | 25.4 | IN | 0 | BA | 27-Jan | 16.5 | OUT | -2 |
| **DE** | 02-Sep | 70.2 | OUT | 3 | DH | 02-Nov | 25.4 | IN | 0 | YA | 27-Jan | 16.5 | OUT | -1 |
| **EB** | 02-Sep | 70.2 | OUT | 3 | AL | 04-Nov | 22.1 | IN | -1 | MO | 28-Jan | 20.5 | IN | -1 |
| **AB** | 02-Sep | 70.2 | OUT | 3 | INB | 04-Nov | 22.1 | IN | -1 | BA | 28-Jan | 20.5 | IN | -1 |
| **YA** | 02-Sep | 70.2 | OUT | 3 | ZAA | 04-Nov | 22.1 | IN | 0 | YA | 28-Jan | 20.5 | IN | -1 |
| **AL** | 02-Sep | 70.2 | OUT | 3 | DH | 04-Nov | 22.1 | IN | -1 | BA | 30-Jan | 5.8 | OUT | -2 |
| **EB** | 06-Sep | 28.7 | IN | 0 | AD | 04-Nov | 22.1 | IN | 0 | MO | 30-Jan | 5.8 | OUT | -2 |
| **YA** | 06-Sep | 28.7 | IN | 0 | AL | 05-Nov | 19.4 | IN | -2 | YA | 30-Jan | 5.8 | OUT | -1 |
| **DE** | 06-Sep | 28.7 | IN | 0 | AD | 05-Nov | 19.4 | IN | 0 | BA | 31-Jan | 6.3 | OUT | -1 |
| **AB** | 06-Sep | 28.7 | IN | 0 | RE | 05-Nov | 19.4 | IN | 0 | MO | 31-Jan | 6.3 | OUT | -1 |
| **DE** | 13-Sep | 54.6 | OUT | 3 | MA | 05-Nov | 19.4 | IN | 0 | YA | 31-Jan | 6.3 | OUT | -1 |
| **EB** | 13-Sep | 54.6 | OUT | 3 | INB | 05-Nov | 19.4 | IN | -1 | BA | 03-Feb | 16.9 | IN | -1 |
| **AB** | 13-Sep | 54.6 | OUT | 3 | DH | 05-Nov | 19.4 | IN | -2 | MO | 03-Feb | 16.9 | IN | -1 |
| **AL** | 13-Sep | 54.6 | OUT | 3 | AL | 06-Nov | 19.8 | IN | 1 | YA | 03-Feb | 16.9 | IN | -1 |
| **YA** | 13-Sep | 54.6 | OUT | 3 | AD | 06-Nov | 19.8 | IN | -3 | G-AY | 04-Feb | 16.6 | IN | -1 |
| **G-RA** | 14-Sep | 24.2 | IN | 0 | INB | 06-Nov | 19.8 | IN | 0 | G-AS | 04-Feb | 16.6 | IN | -1 |
| **AL** | 14-Sep | 24.2 | IN | 0 | DH | 06-Nov | 19.8 | IN | -2 | G-RA | 04-Feb | 16.6 | IN | -1 |
| **YA** | 14-Sep | 24.2 | IN | 0 | ZAA | 06-Nov | 19.8 | IN | -3 | BA | 04-Feb | 16.6 | IN | -1 |
| **AN** | 14-Sep | 24.2 | IN | 0 | MA | 06-Nov | 19.8 | IN | 0 | MO | 04-Feb | 16.6 | IN | -1 |
| **DE** | 14-Sep | 24.2 | IN | 0 | G-ZA | 06-Nov | 19.8 | IN | 0 | YA | 04-Feb | 16.6 | IN | -1 |
| **G-AR** | 15-Sep | 25.8 | IN | 0 | G-AR | 06-Nov | 19.8 | IN | 0 | WA | 05-Feb | 19.3 | IN | -1 |
| **AB** | 15-Sep | 25.8 | IN | 0 | AL | 07-Nov | 20.7 | IN | 1 | HU | 05-Feb | 19.3 | IN | -1 |
| **AL** | 15-Sep | 25.8 | IN | 0 | INB | 07-Nov | 20.7 | IN | 0 | MO | 16-Jul | 29.4 | IN | 0 |
| **YA** | 15-Sep | 25.8 | IN | 0 | G-ZA | 07-Nov | 20.7 | IN | 0 | DH | 16-Jul | 29.4 | IN | 0 |
| **DE** | 15-Sep | 25.8 | IN | 0 | G-AR | 07-Nov | 20.7 | IN | 0 | AH | 18-Jul | 25.5 | IN | 0 |
| **EB** | 15-Sep | 25.8 | IN | 0 | MA | 07-Nov | 20.7 | IN | -1 | MS | 18-Jul | 25.5 | IN | -1 |
| **G-YD** | 16-Sep | 27.6 | IN | 0 | ZAA | 07-Nov | 20.7 | IN | -2 | DH | 18-Jul | 25.5 | IN | 0 |
| **G-GIN** | 16-Sep | 27.6 | IN | 0 | AD | 07-Nov | 20.7 | IN | 0 | HU | 18-Jul | 25.5 | IN | 0 |
| **G-RA** | 16-Sep | 27.6 | IN | 0 | DH | 07-Nov | 20.7 | IN | -2 | MO | 18-Jul | 25.5 | IN | -1 |
| **AL** | 16-Sep | 27.6 | IN | 0 | AL | 08-Nov | 20.1 | IN | -2 | WA | 18-Jul | 25.5 | IN | 0 |
| **YA** | 16-Sep | 27.6 | IN | 0 | RE | 08-Nov | 20.1 | IN | -1 | AH | 24-Jul | 25.9 | IN | -1 |
| **AB** | 16-Sep | 27.6 | IN | 0 | DH | 08-Nov | 20.1 | IN | 0 | HU | 24-Jul | 25.9 | IN | -1 |
| **G-KA** | 16-Sep | 27.6 | IN | 0 | AL | 09-Nov | 22.2 | IN | 0 | MS | 24-Jul | 25.9 | IN | 0 |
| **G-DE** | 17-Sep | 28.5 | IN | 0 | DH | 09-Nov | 22.2 | IN | 0 | WA | 24-Jul | 25.9 | IN | 0 |
| **G-ZA** | 17-Sep | 28.5 | IN | 0 | AD | 09-Nov | 22.2 | IN | 0 | AH | 25-Jul | 27.8 | IN | 0 |
| **G-AR2** | 17-Sep | 28.5 | IN | 0 | MA | 09-Nov | 22.2 | IN | 0 | DH | 25-Jul | 27.8 | IN | 0 |
| **G-OM2** | 17-Sep | 28.5 | IN | 0 | INB | 09-Nov | 22.2 | IN | 1 | HU | 25-Jul | 27.8 | IN | 0 |
| **G-DB** | 17-Sep | 28.5 | IN | 0 | G-HU | 09-Nov | 22.2 | IN | 0 | WA | 25-Jul | 27.8 | IN | 0 |
| **G-RA** | 17-Sep | 28.5 | IN | 0 | G-AH | 09-Nov | 22.2 | IN | 0 | AH | 26-Jul | 27.6 | IN | 0 |
| **G-YD** | 19-Sep | 27.5 | IN | 2 | RE | 09-Nov | 22.2 | IN | 0 | WA | 26-Jul | 27.6 | IN | 0 |
| **G-GIN** | 19-Sep | 27.5 | IN | 0 | AL | 07-Oct | 20.3 | IN | 0 | DH | 26-Jul | 27.6 | IN | -1 |
| **G-GH** | 19-Sep | 27.5 | IN | 1 | MA | 07-Oct | 20.3 | IN | 0 | HU | 26-Jul | 27.6 | IN | 0 |
| **G-RA** | 19-Sep | 27.5 | IN | 0 | RE | 07-Oct | 20.3 | IN | 0 | AH | 26-Jul | 33.9 | OUT | 2 |
| **G-KA2** | 19-Sep | 27.5 | IN | 0 | DH | 07-Oct | 20.3 | IN | -1 | DH | 26-Jul | 33.9 | OUT | 2 |
| **AL** | 19-Sep | 27.5 | IN | 0 | AD | 07-Oct | 20.3 | IN | -1 | AH | 27-Jul | 28.6 | IN | 1 |
| **G-RU** | 20-Sep | 26.2 | IN | 0 | AL | 15-Nov | 21.4 | IN | 0 | WA | 27-Jul | 28.6 | IN | 1 |
| **G-MOS** | 20-Sep | 26.2 | IN | 0 | AD | 15-Nov | 21.4 | IN | 0 | MS | 27-Jul | 28.6 | IN | 0 |
| **EB** | 20-Sep | 26.2 | IN | 0 | INB | 15-Nov | 21.4 | IN | 0 | HU | 27-Jul | 28.6 | IN | 0 |
| **YA** | 20-Sep | 26.2 | IN | 0 | DH | 15-Nov | 21.4 | IN | 0 | DH | 27-Jul | 28.6 | IN | 1 |
| **AB** | 20-Sep | 26.2 | IN | 0 | MA | 15-Nov | 21.4 | IN | 0 | AH | 28-Jul | 26.1 | IN | 0 |
| **DE** | 20-Sep | 26.2 | IN | -1 | G-EM | 15-Nov | 21.4 | IN | 0 | AH | 28-Jul | 29.8 | OUT | 1 |
| **EB** | 26-Sep | 26.2 | IN | 0 | G-RA | 15-Nov | 21.4 | IN | 0 | AH | 29-Jul | 29.6 | IN | 2 |
| **AL** | 26-Sep | 26.2 | IN | 0 | G-NA | 15-Nov | 21.4 | IN | 0 | AH | 29-Jul | 31.8 | OUT | 2 |
| **YA** | 26-Sep | 26.2 | IN | 0 | AL | 17-Nov | 20.3 | IN | 0 | AH | 30-Jul | 29.2 | IN | 1 |
| **DE** | 26-Sep | 26.2 | IN | 0 | G-ZA | 17-Nov | 20.3 | IN | 0 | AH | 03-Aug | 31.4 | OUT | 1 |
| **AB** | 26-Sep | 26.2 | IN | 0 | DH | 17-Nov | 20.3 | IN | 0 | AH | 03-Aug | 25.9 | IN | -1 |
| **G-SIN** | 29-Sep | 27.4 | IN | 0 | AD | 17-Nov | 20.3 | IN | 0 | AH | 03-Aug | 32.3 | OUT | 1 |
| **G-RE** | 29-Sep | 27.4 | IN | 0 | INB | 17-Nov | 20.3 | IN | 0 | AH | 05-Aug | 29.7 | IN | 1 |
| **G-RA** | 29-Sep | 27.4 | IN | 0 | MA | 17-Nov | 20.3 | IN | 0 | MO | 05-Aug | 29.7 | IN | 1 |
| **AL** | 29-Sep | 27.4 | IN | 0 | AL | 20-Nov | 18.7 | IN | 0 | HU | 05-Aug | 29.7 | IN | 2 |
| **YA** | 29-Sep | 27.4 | IN | 0 | RE | 20-Nov | 18.7 | IN | 0 | AH | 05-Aug | 29.7 | OUT | 2 |
| **EB** | 29-Sep | 27.4 | IN | 0 | MA | 20-Nov | 18.7 | IN | 0 | AH | 08-Aug | 31.9 | IN | -1 |
| **DE** | 29-Sep | 27.4 | IN | 0 | INB | 20-Nov | 18.7 | IN | 0 | MO | 08-Aug | 25.4 | IN | -1 |
| **G-AM** | 11-Oct | 25.5 | IN | 0 | DH | 20-Nov | 18.7 | IN | 0 | MS | 09-Aug | 25.4 | IN | 1 |
| **G-KA2** | 11-Oct | 25.5 | IN | 0 | AD | 20-Nov | 18.7 | IN | 0 | WA | 09-Aug | 29.5 | IN | 1 |
| **G-GA** | 11-Oct | 25.5 | IN | 0 | AL | 22-Nov | 18.1 | IN | 0 | AH | 09-Aug | 29.5 | IN | 1 |
| **G-ZA** | 11-Oct | 25.5 | IN | 0 | DH | 22-Nov | 18.1 | IN | -2 | HU | 09-Aug | 29.5 | IN | 1 |
| **G-AY** | 11-Oct | 25.5 | IN | 0 | AD | 22-Nov | 18.1 | IN | -2 | DH | 09-Aug | 29.5 | IN | 1 |
| **G-BA** | 11-Oct | 25.5 | IN | -2 | RE | 22-Nov | 18.1 | IN | 0 | AH | 10-Aug | 24.5 | IN | 0 |
| **G-YO** | 11-Oct | 25.5 | IN | 0 | INB | 22-Nov | 18.1 | IN | 0 | WA | 10-Aug | 24.5 | IN | 0 |
| **G-SU** | 11-Oct | 25.5 | IN | -1 | MA | 22-Nov | 18.1 | IN | 0 | MS | 10-Aug | 24.5 | IN | 0 |
| **G-NA** | 11-Oct | 25.5 | IN | 0 | AL | 23-Nov | 17.9 | IN | 0 | DH | 10-Aug | 24.5 | IN | 0 |
| **G-FA** | 11-Oct | 25.5 | IN | 0 | G-HU | 23-Nov | 17.9 | IN | -1 | AH | 10-Aug | 33.2 | OUT | 1 |
| **G-RA** | 11-Oct | 25.5 | IN | 0 | G-AH | 23-Nov | 17.9 | IN | -1 | WA | 10-Aug | 33.2 | OUT | 1 |
| **G-MA** | 11-Oct | 25.5 | IN | 1 | G-ZA | 23-Nov | 17.9 | IN | 0 | MS | 10-Aug | 33.2 | OUT | 1 |
| **G-MA2** | 11-Oct | 25.5 | IN | 0 | RE | 23-Nov | 17.9 | IN | -1 | DH | 10-Aug | 33.2 | OUT | 1 |
| **G-TA** | 11-Oct | 25.5 | IN | 0 | INB | 23-Nov | 17.9 | IN | 0 | AH | 11-Aug | 25.7 | IN | -1 |
| **G-RA** | 11-Oct | 25.5 | IN | 0 | AD | 23-Nov | 17.9 | IN | 0 | MO | 11-Aug | 25.7 | IN | -1 |
| **G-AM** | 11-Oct | 25.5 | IN | 0 | AH | 26-Oct | 25.2 | IN | 0 | WA | 11-Aug | 25.7 | IN | 0 |
| **G-KA2** | 11-Oct | 25.5 | IN | 0 | AH | 27-Oct | 25.8 | IN | 0 | AH | 16-Aug | 29.3 | IN | 1 |
| **G-GA** | 11-Oct | 25.5 | IN | 0 | AH | 27-Oct | 25.8 | IN | -1 | DH | 16-Aug | 29.3 | IN | 1 |
| **G-ZA** | 11-Oct | 25.5 | IN | 0 | MS | 28-Oct | 25.1 | IN | 1 | HU | 16-Aug | 29.3 | IN | 2 |
| **G-AY** | 11-Oct | 25.5 | IN | 0 | MS | 29-Oct | 25.8 | IN | 1 | AH | 16-Aug | 26.4 | IN | 0 |
| **G-BA** | 11-Oct | 25.5 | IN | -2 | MS | 29-Oct | 27.2 | OUT | 1 | HU | 16-Aug | 26.4 | IN | 0 |
| **G-YO** | 11-Oct | 25.5 | IN | 0 | MS | 29-Oct | 25.2 | OUT | 0 | DH | 16-Aug | 26.4 | IN | -1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **G-SU** | 11-Oct | 25.5 | IN | -1 | AH | 30-Oct | 26.3 | IN | 0 | MS | 16-Aug | 26.4 | IN | 0 |
| **G-NA** | 11-Oct | 25.5 | IN | 0 | AH | 31-Oct | 24.9 | IN | 0 | AH | 26-Aug | 26 | IN | 0 |
| **G-FA** | 11-Oct | 25.5 | IN | 0 | AH | 01-Nov | 24.9 | IN | 0 | MO | 26-Aug | 26 | IN | 0 |
| **G-RA** | 11-Oct | 25.5 | IN | 0 | MS | 03-Nov | 24.6 | IN | 1 | MS | 26-Aug | 26 | IN | 0 |
| **G-MA** | 11-Oct | 25.5 | IN | 2 | G | 03-Nov | 24.1 | IN | 0 | WA | 26-Aug | 26 | IN | 0 |
| **G-MA2** | 11-Oct | 25.5 | IN | 0 | AH | 03-Nov | 4.1 | IN | 0 | AH | 26-Aug | 27.3 | OUT | 0 |
| **G-TA** | 11-Oct | 25.5 | IN | 0 | MS | 03-Nov | 24.1 | IN | 1 | AH | 30-Aug | 29.3 | IN | 0 |
| **G-RA** | 11-Oct | 25.5 | IN | 0 | AH | 04-Jan | 23.2 | IN | -1 | MS | 30-Aug | 29.3 | IN | 0 |
| **G-GH** | 10-Nov | 23.3 | IN | 0 | MS | 04-Nov | 24.5 | IN | -1 | WA | 30-Aug | 29.3 | IN | 0 |
| **G-ZAH** | 10-Nov | 23.3 | IN | 0 | AH | 04-Nov | 24.5 | IN | -1 | HU | 30-Aug | 29.3 | IN | 0 |
| **G-RA** | 10-Nov | 23.3 | IN | 0 | ES | 05-Nov | 23.4 | IN | 0 | DH | 30-Aug | 29.3 | IN | 0 |
| **DE** | 10-Nov | 23.3 | IN | 0 | AH | 05-Nov | 23.4 | IN | -1 | AH | 30-Aug | 29.5 | IN | 0 |
| **AL** | 27-Oct | 26.8 | IN | 0 | MS | 05-Nov | 23.4 | IN | 0 | AH | 01-Sep | 29.3 | IN | 1 |
| **AL** | 27-Oct | 26.8 | IN | 1 | AH | 05-Nov | 23.7 | IN | 0 | MS | 01-Sep | 29.3 | IN | 1 |
| **G-SA** | 27-Oct | 26.8 | IN | 1 | MS | 06-Nov | 23.7 | IN | 1 | MO | 01-Sep | 29.3 | IN | 1 |
| **INB** | 27-Oct | 22 | IN | 1 | DH | 08-Nov | 24 | IN | -1 | WA | 01-Sep | 29.3 | IN | 0 |
| **AD** | 27-Oct | 22 | IN | 0 | AH | 08-Nov | 25 | IN | -1 | AH | 01-Sep | 30.4 | OUT | 1 |
| **G-AR** | 27-Oct | 22 | IN | 0 | MS | 09-Nov | 23.3 | IN | 0 | MO | 01-Sep | 30.4 | OUT | 1 |
| **G-ZA** | 27-Oct | 22 | IN | 0 | AH | 09-Nov | 23.9 | IN | 0 | AH | 03-Sep | 24.6 | IN | 0 |
| **RE** | 27-Oct | 22 | IN | 1 | WA | 09-Nov | 23.9 | IN | 0 | MS | 03-Sep | 24.6 | IN | 0 |
| **MA** | 27-Oct | 22 | IN | 0 | MS | 09-Nov | 23.9 | IN | 0 | WA | 03-Sep | 24.6 | IN | 0 |
| **AL** | 25-Oct | 28.1 | IN | 3 | MO | 09-Nov | 23.9 | IN | 0 | HU | 03-Sep | 24.6 | IN | 0 |
| **DH** | 25-Oct | 28.1 | IN | 0 | HU | 10-Nov | 23.7 | IN | 0 | AH | 03-Sep | 35.2 | OUT | 1 |
| **INB** | 25-Oct | 28.1 | IN | 2 | AH | 10-Nov | 23.7 | IN | 0 | MS | 03-Sep | 35.2 | OUT | 1 |
| **RE** | 25-Oct | 28.1 | IN | 2 | MO | 10-Nov | 23.7 | IN | -1 | AH | 06-Sep | 29.1 | IN | 1 |
| **MA** | 25-Oct | 28.1 | IN | 0 | AH | 13-Nov | 23.7 | IN | -1 | WA | 06-Sep | 29.1 | IN | 0 |
| **G-AR** | 25-Oct | 28.1 | IN | 2 | MS | 13-Nov | 23.7 | IN | 0 | DH | 06-Sep | 29.1 | IN | 0 |
| **AL** | 29-Oct | 23.3 | OUT | -1 | AH | 13-Nov | 20.7 | OUT | -2 | MO | 06-Sep | 29.1 | IN | 0 |
| **AD** | 29-Oct | 23.3 | OUT | -1 | DH | 13-Nov | 19.7 | IN | 0 | AH | 06-Sep | 29.2 | OUT | 1 |
| **RE** | 29-Oct | 23.3 | OUT | -1 | WA | 13-Nov | 19.7 | IN | 0 | AH | 07-Sep | 29 | OUT | 1 |
| **INB** | 29-Oct | 23.3 | OUT | 0 | MS | 14-Nov | 23.5 | IN | 0 | HU | 07-Sep | 29 | IN | 0 |
| **G-AR** | 29-Oct | 23.3 | OUT | 0 | MS | 14-Nov | 22.6 | OUT | -1 | MO | 07-Sep | 29 | IN | 0 |
| **G=SA** | 29-Oct | 23.3 | OUT | 0 | AH | 11-Nov | 21.8 | IN | -1 | AH | 07-Sep | 30 | OUT | 1 |
| **DH** | 29-Oct | 23.3 | OUT | -2 | DH | 11-Nov | 22.1 | IN | -1 | AH | 10-Sep | 29.4 | IN | 0 |
| **MA** | 29-Oct | 23.3 | OUT | -1 | AH | 14-Nov | 19.1 | OUT | -2 | WA | 10-Sep | 29.4 | IN | 0 |
| **AL** | 01-Nov | 23.9 | IN | -1 | MS | 16-Nov | 23.8 | IN | 1 | DH | 10-Sep | 29.4 | IN | 0 |
| **RE** | 01-Nov | 23.9 | IN | -1 | EM | 16-Nov | 23.8 | IN | 0 | HU | 10-Sep | 29.4 | IN | 0 |
| **AD** | 01-Nov | 23.9 | IN | 0 | AH | 17-Nov | 23.6 | IN | 0 | AH | 11-Sep | 28.4 | IN | 0 |
| **DH** | 01-Nov | 23.9 | IN | 0 | MS | 17-Nov | 23.6 | IN | 0 | DH | 11-Sep | 28.4 | IN | 0 |
| **G-ZA** | 01-Nov | 23.9 | IN | 0 | AH | 17-Nov | 21.8 | OUT | -1 | WA | 11-Sep | 28.4 | IN | 0 |
| **MA** | 01-Nov | 23.9 | IN | 0 | HU | 18-Nov | 22.9 | IN | -1 | HU | 11-Sep | 28.4 | IN | 0 |
| **INB** | 01-Nov | 23.9 | IN | 0 | MS | 20-Nov | 22.8 | IN | -1 | AH | 11-Sep | 28.4 | IN | 0 |
| **AL** | 02-Nov | 23.6 | IN | 1 | DH | 20-Nov | 23.2 | IN | 0 | AH | 11-Sep | 28.7 | OUT | 0 |
| **G-AR** | 02-Nov | 23.6 | IN | 1 | MS | 21-Nov | 23.7 | IN | 0 | HU | 12-Sep | 24.9 | IN | -1 |
| **G-SA** | 02-Nov | 23.6 | IN | 0 | DH | 22-Nov | 21.9 | IN | -1 | DH | 12-Sep | 24.9 | IN | -1 |
| **MA** | 02-Nov | 23.6 | IN | 0 | MS | 22-Nov | 21.7 | IN | 0 | WA | 12-Sep | 24.9 | IN | 0 |
| **INB** | 02-Nov | 23.6 | IN | 0 | MS | 27-Nov | 18.9 | IN | 0 | AH | 18-Sep | 26.7 | IN | 0 |
| **AD** | 02-Nov | 23.6 | IN | 0 | MS | 27-Nov | 17.7 | OUT | -1 | MS | 16-Sep | 26.7 | IN | 0 |
| **DH** | 02-Nov | 23.6 | IN | 0 | AH | 27-Nov | 19.5 | IN | -1 | AH | 20-Sep | 25.1 | IN | -1 |
| **G-ZA** | 02-Nov | 23.6 | IN | 0 | MS | 27-Nov | 19.5 | IN | -1 | MO | 20-Sep | 25.1 | IN | -1 |
| **AL** | 03-Nov | 25.2 | IN | 1 | AH | 28-Nov | 17.7 | IN | -2 | MS | 20-Sep | 25.1 | IN | 0 |
| **G-AH** | 03-Nov | 25.2 | IN | 1 | MO | 28-Nov | 17.7 | IN | -2 | AH | 20-Sep | 27.7 | OUT | 0 |
| **G-ZAH** | 03-Nov | 25.2 | IN | 1 | MS | 28-Nov | 21.7 | IN | 0 | AH | 12-Oct | 27.4 | IN | 0 |
| **DH** | 03-Nov | 25.2 | IN | 0 | AH | 28-Nov | 21.7 | IN | 0 | WA | 12-Oct | 27.4 | IN | 0 |
| **G-AR** | 03-Nov | 25.2 | IN | 1 | MO | 02-Nov | 21.7 | IN | 0 | DH | 12-Oct | 27.4 | IN | 0 |
| **G-SA** | 03-Nov | 25.2 | IN | 1 | HU | 28-Nov | 21.7 | IN | 0 | AH | 12-Oct | 25.1 | OUT | 0 |
| **AD** | 03-Nov | 25.2 | IN | 0 | WA | 28-Nov | 21.7 | IN | 0 | AH | 13-Oct | 27.3 | IN | 0 |
| **G-ZA** | 03-Nov | 25.2 | IN | 0 | AH | 28-Nov | 18.2 | OUT | -1 | MO | 13-Oct | 27.3 | IN | 0 |
| **RE** | 03-Nov | 25.2 | IN | 1 | MS | 29-Nov | 19.2 | OUT | -1 | WA | 13-Oct | 27.3 | IN | 0 |
| **INB** | 03-Nov | 25.2 | IN | 1 | MS | 30-Nov | 21.1 | OUT | 0 | AH | 14-Oct | 27.3 | IN | 0 |
| **MA** | 03-Nov | 25.2 | IN | 0 | AH | 12-Jan | 20.2 | IN | -1 | MS | 14-Oct | 27.3 | IN | 0 |
| **A** | 04-Nov | 25.8 | IN | 1 | MS | 12-Jan | 20.2 | IN | 0 | WA | 14-Oct | 27.3 | IN | 0 |
| **G-SA** | 04-Nov | 25.8 | IN | 0 | DH | 12-Jan | 20.2 | IN | 0 | DH | 14-Oct | 27.3 | IN | 0 |
| **G-AR** | 04-Nov | 25.8 | IN | 1 | WA | 12-Jan | 20.2 | IN | 0 | AH | 14-Oct | 26.3 | OUT | 0 |
| **AD** | 04-Nov | 25.8 | IN | 1 | HU | 12-Jan | 20.2 | IN | 0 | AH | 17-Oct | 27.3 | IN | 1 |
| **INB** | 04-Nov | 25.8 | IN | 0 | AH | 12-Jan | 19.2 | OUT | -1 | DH | 17-Oct | 27.3 | IN | 0 |
| **RE** | 04-Nov | 25.8 | IN | 1 | AH | 12-Jan | 22.2 | IN | 0 | WA | 17-Oct | 27.3 | IN | 0 |
| **ZAA** | 04-Nov | 25.8 | IN | 0 | MS | 12-Jan | 22.2 | IN | 0 | HU | 17-Oct | 27.3 | IN | 0 |
| **MA** | 04-Nov | 25.8 | IN | 1 | AH | 12-Jan | 17.4 | OUT | -1 | MS | 17-Oct | 27.3 | IN | 1 |
| **AL** | 06-Nov | 24.4 | IN | 0 | AH | 02-Dec | 25.1 | IN | 1 | AH | 17-Oct | 27.4 | OUT | 1 |
| **G-AH** | 06-Nov | 24.4 | IN | 0 | MS | 02-Dec | 25.1 | IN | 2 | AH | 21-Oct | 25.4 | IN | 0 |
| **MA** | 06-Nov | 24.4 | IN | 0 | HU | 02-Dec | 25.1 | IN | 2 | MO | 21-Oct | 25.4 | IN | 0 |
| **INB** | 06-Nov | 24.4 | IN | 0 | DH | 02-Dec | 25.1 | IN | 0 | WA | 21-Oct | 25.4 | IN | 0 |
| **DH** | 06-Nov | 24.4 | IN | 0 | AH | 02-Dec | 20.8 | OUT | -1 | DH | 21-Oct | 25.3 | IN | -1 |
| **RE** | 06-Nov | 24.4 | IN | 0 | DH | 03-Dec | 27.8 | IN | 0 | AH | 22-Oct | 26.4 | IN | 1 |
| **AL** | 07-Nov | 25 | IN | 0 | AH | 03-Dec | 24.9 | IN | 0 | DH | 22-Oct | 26.4 | IN | 0 |
| **G-AH** | 07-Nov | 25 | IN | 0 | AH | 03-Jan | 24.9 | IN | 0 | MO | 22-Oct | 26.4 | IN | 0 |
| **INB** | 07-Nov | 25 | IN | 0 | MS | 03-Jan | 24.9 | IN | 1 | MS | 22-Oct | 26.4 | IN | 1 |
| **DH** | 07-Nov | 25 | IN | 0 | WA | 03-Jan | 24.9 | IN | 0 | WA | 22-Oct | 26.4 | IN | 0 |
| **RE** | 07-Nov | 25 | IN | 0 | AH | 04-Jan | 23.6 | IN | 1 | AH | 22-Oct | 24.8 | OUT | 0 |
| **MA** | 07-Nov | 25 | IN | 0 | DH | 04-Jan | 23.6 | IN | 0 | AH | 23-Oct | 25.2 | IN | 0 |
| **AD** | 07-Nov | 25 | IN | 0 | MS | 04-Jan | 23.6 | IN | 1 | HU | 23-Oct | 25.2 | IN | 0 |
| **AL** | 08-Nov | 24.4 | IN | 0 | WA | 04-Jan | 23.6 | IN | 0 | MS | 23-Oct | 25.2 | IN | 0 |
| **RE** | 08-Nov | 24.4 | IN | 0 | HU | 04-Jan | 23.6 | IN | 0 | WA | 23-Oct | 25.2 | IN | 0 |
| **G-AH** | 08-Nov | 24.4 | IN | 0 | MS | 05-Jan | 19.6 | IN | 0 | MO | 23-Oct | 25.2 | IN | 0 |
| **INB** | 08-Nov | 24.4 | IN | 0 | HU | 05-Jan | 20.1 | OUT | 0 | DH | 23-Oct | 25.2 | IN | 0 |
| **DH** | 08-Nov | 24.4 | IN | 0 | AH | 07-Jan | 18.8 | OUT | -1 | AH | 23-Oct | 24.3 | OUT | 0 |
| **ZAA** | 08-Nov | 24.4 | IN | 0 | HU | 07-Jan | 18.8 | IN | -1 | DH | 25-Oct | 24.4 | IN | -1 |
| **AL** | 10-Nov | 21.9 | IN | 0 | AH | 12-Dec | 21.8 | IN | -1 | WA | 25-Oct | 24.3 | IN | 0 |
| **INB** | 10-Nov | 21.9 | IN | 0 | MS | 12-Dec | 21.8 | IN | 0 | AH | 30-Oct | 22.7 | IN | -1 |
| **RE** | 10-Nov | 21.9 | IN | 0 | WA | 12-Dec | 21.8 | IN | 0 | MO | 30-Oct | 22.7 | IN | 0 |
| **MA** | 10-Nov | 21.9 | IN | 0 | MS | 14-Dec | 18.4 | IN | -1 | MS | 30-Oct | 22.7 | IN | 0 |
| **G-AH** | 10-Nov | 21.9 | IN | 0 | MS | 14-Dec | 18.8 | OUT | -1 | AH | 31-Oct | 17.4 | IN | 0 |
| **G-RA** | 10-Nov | 21.9 | IN | 0 | DH | 20-Dec | 19.8 | IN | -2 | WA | 31-Oct | 17.4 | IN | 0 |
| **G-EM** | 10-Nov | 21.9 | IN | 0 | MS | 20-Dec | 19.8 | IN | -1 | MS | 31-Oct | 17.4 | IN | 0 |
| **G-NA** | 10-Nov | 21.9 | IN | 0 | MS | 23-Dec | 21.4 | IN | 0 | AH | 01-Nov | 22.7 | IN | 0 |
| **G-MO2** | 10-Nov | 21.9 | IN | 0 | MS | 24-Dec | 19.3 | IN | 0 | MO | 01-Nov | 22.7 | IN | 0 |
| **AL** | 11-Nov | 22 | IN | -1 | DH | 24-Dec | 16.6 | OUT | -1 | MS | 01-Nov | 22.7 | IN | 0 |
| **INB** | 11-Nov | 22 | IN | 0 | MO | 24-Dec | 21.4 | IN | 0 | WA | 01-Nov | 22.7 | IN | -1 |
| **G-AH** | 11-Nov | 22 | IN | 0 | MS | 29-Dec | 21.5 | IN | 0 | HU | 01-Nov | 22.7 | IN | 0 |

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|---|---|---|---|---|
| **RE** | 11-Nov | 22 | IN | 0 |
| **AL** | 11-Nov | 22 | IN | 0 |
| **INB** | 11-Nov | 15.2 | OUT | -2 |
| **RE** | 11-Nov | 15.2 | OUT | -3 |
| **AD** | 11-Nov | 15.2 | OUT | -3 |
| **G-AH2** | 11-Nov | 15.2 | OUT | -2 |
| **DH** | 11-Nov | 15.2 | OUT | -2 |
| **AL** | 19-Nov | 22.4 | IN | 0 |
| **G-AH** | 19-Nov | 22.4 | IN | 0 |
| **INB** | 19-Nov | 22.4 | IN | 0 |
| **ZAA** | 19-Nov | 22.4 | IN | 0 |
| **AD** | 19-Nov | 22.4 | IN | 0 |
| **DH** | 19-Nov | 22.4 | IN | 0 |
| **AL** | 19-Nov | 43.1 | OUT | 1 |
| **AD** | 19-Nov | 43.1 | OUT | 0 |
| **G-AH** | 19-Nov | 43.1 | OUT | 0 |
| **AL** | 20-Nov | 21.3 | IN | 0 |
| **INB** | 20-Nov | 21.3 | IN | 0 |
| **G-AH** | 20-Nov | 21.3 | IN | 0 |
| **DH** | 20-Nov | 21.3 | IN | 0 |
| **ZAA** | 20-Nov | 21.3 | IN | 0 |
| **AL** | 22-Nov | 19 | IN | -1 |
| **INB** | 22-Nov | 19 | IN | -1 |
| **RE** | 22-Nov | 19 | IN | -1 |
| **DH** | 22-Nov | 19 | IN | -1 |
| **G-AH** | 22-Nov | 19 | IN | -1 |
| **AL** | 23-Nov | 16.6 | IN | -1 |
| **MA** | 23-Nov | 16.6 | IN | -1 |
| **INB** | 23-Nov | 16.6 | IN | 0 |
| **RE** | 23-Nov | 16.6 | IN | -2 |
| **ZAA** | 23-Nov | 16.6 | IN | -1 |
| **G-AH** | 23-Nov | 16.6 | IN | -2 |
| **DH** | 23-Nov | 16.6 | IN | -3 |
| **AL** | 24-Nov | 16.2 | IN | 0 |
| **RE** | 24-Nov | 16.2 | IN | 0 |
| **INB** | 24-Nov | 16.2 | IN | 0 |
| **MA** | 24-Nov | 16.2 | IN | 0 |
| **ZAA** | 24-Nov | 16.2 | IN | 1 |
| **DH** | 24-Nov | 16.2 | IN | -1 |
| **AD** | 24-Nov | 16.2 | IN | -1 |
| **AL** | 25-Nov | 15.6 | IN | -1 |
| **DH** | 25-Nov | 15.6 | IN | -2 |
| **AD** | 25-Nov | 15.6 | IN | -3 |
| **RE** | 25-Nov | 15.6 | IN | -2 |
| **MA** | 25-Nov | 15.6 | IN | -2 |
| **AL** | 27-Nov | 15.3 | IN | 0 |
| **G-AH** | 27-Nov | 15.3 | IN | 0 |
| **DH** | 27-Nov | 15.3 | IN | 0 |
| **RE** | 27-Nov | 15.3 | IN | 0 |
| **ZAA** | 27-Nov | 15.3 | IN | 0 |
| **AL** | 28-Nov | 16.6 | IN | -2 |
| **DH** | 28-Nov | 16.6 | IN | -2 |
| **AD** | 28-Nov | 16.6 | IN | -2 |
| **MA** | 28-Nov | 16.6 | IN | -2 |
| **ZAA** | 28-Nov | 16.6 | IN | -2 |
| **AL** | 28-Nov | 10.1 | OUT | -3 |
| **DH** | 28-Nov | 10.1 | OUT | -3 |
| **RE** | 28-Nov | 10.1 | OUT | -3 |
| **INB** | 28-Nov | 10.1 | OUT | -3 |
| **MA** | 28-Nov | 10.1 | OUT | -3 |
| **AD** | 28-Nov | 10.1 | OUT | -3 |
| **AL** | 29-Nov | 16.1 | IN | 0 |
| **AD** | 29-Nov | 16.1 | IN | 0 |
| **DH** | 29-Nov | 16.1 | IN | 0 |
| **AL** | 30-Nov | 19.7 | OUT | 0 |
| **RE** | 30-Nov | 19.7 | OUT | 0 |
| **ZAA** | 30-Nov | 19.7 | OUT | 0 |
| **INB** | 30-Nov | 19.7 | OUT | 0 |
| **MA** | 30-Nov | 19.7 | OUT | 0 |
| **AD** | 30-Nov | 19.7 | OUT | 0 |
| **G-AH2** | 30-Nov | 19.7 | OUT | 0 |
| **G-ZAH** | 30-Nov | 19.7 | OUT | 0 |
| **G-YAH** | 30-Nov | 19.7 | OUT | 0 |
| **DH** | 30-Nov | 19.7 | OUT | 0 |
| **AL** | 04-Dec | 18.8 | IN | 0 |
| **AD** | 04-Dec | 18.8 | IN | 0 |
| **MA** | 04-Dec | 18.8 | IN | 0 |
| **INB** | 04-Dec | 18.8 | IN | 0 |
| **RE** | 04-Dec | 18.8 | IN | 0 |
| **DH** | 04-Dec | 18.8 | IN | 0 |
| **AL** | 05-Dec | 19.2 | IN | 0 |
| **INB** | 05-Dec | 19.2 | IN | 0 |
| **DH** | 05-Dec | 19.2 | IN | 0 |
| **AL** | 13-Dec | 30.3 | IN | 0 |
| **AD** | 13-Dec | 30.3 | IN | 0 |
| **INB** | 13-Dec | 30.3 | IN | 0 |
| **G-AH2** | 13-Dec | 30.3 | IN | 0 |
| **G-SA** | 13-Dec | 30.3 | IN | 0 |
| **G-GA** | 13-Dec | 30.3 | IN | 0 |
| **G-OM** | 13-Dec | 30.3 | IN | 0 |
| **DH** | 13-Dec | 30.3 | IN | 0 |
| **MA** | 13-Dec | 30.3 | IN | 0 |
| **G-EN** | 13-Dec | 30.3 | IN | 0 |
| **G-ZA** | 13-Dec | 30.3 | IN | 0 |
| **AL** | 15-Dec | 18.3 | IN | 0 |
| **G-SA** | 15-Dec | 18.3 | IN | -1 |
| **ZAA** | 15-Dec | 18.3 | IN | 0 |
| **MA** | 15-Dec | 18.3 | IN | 0 |
| **AD** | 15-Dec | 18.3 | IN | 0 |
| **DH** | 15-Dec | 18.3 | IN | 0 |
| MS | 02-Dec | 21.5 | IN | 0 |
| WA | 29-Dec | 21.5 | IN | 0 |
| MS | 29-Dec | 19.5 | IN | -1 |
| WA | 29-Dec | 19.5 | IN | -1 |
| DH | 27-Dec | 20.6 | IN | 1 |
| MS | 28-Dec | 24.4 | IN | 0 |
| AH | 28-Dec | 24.4 | IN | 0 |
| MS | 31-Dec | 20.7 | IN | 0 |
| AH | 31-Dec | 15.3 | IN | 0 |
| MS | 01-Jan | 20.9 | IN | 0 |
| AH | 01-Jan | 16.4 | IN | 0 |
| MS | 04-Jan | 21.6 | IN | 0 |
| MS | 05-Jan | 21.2 | IN | -1 |
| AH | 05-Jan | 16.1 | IN | -2 |
| DH | 05-Jan | 16.1 | IN | -1 |
| AH | 06-Jan | 18.7 | IN | -1 |
| HU | 06-Jan | 25.3 | IN | 0 |
| MS | 07-Jan | 18.2 | IN | 0 |
| MS | 07-Jan | 18.8 | OUT | 0 |
| MS | 11-Jan | 13.9 | OUT | -1 |
| MS | 12-Jan | 19.3 | IN | -1 |
| MS | 12-Jan | 22.6 | IN | 0 |
| WA | 12-Jan | 22.6 | IN | 0 |
| MS | 12-Jan | 20.2 | OUT | -1 |
| AH | 14-Jan | 23.5 | IN | 1 |
| MS | 14-Jan | 17.2 | IN | 1 |
| MO | 14-Jan | 23.2 | IN | 1 |
| DH | 14-Jan | 23.2 | IN | 1 |
| WA | 14-Jan | 23.2 | IN | 0 |
| HU | 20-May | 23.2 | IN | 0 |
| AH | 15-Jan | 18.2 | IN | 0 |
| MS | 15-Jan | 18.2 | IN | 0 |
| AH | 15-Jan | 24.4 | IN | 0 |
| DH | 15-Jan | 24.4 | IN | 0 |
| HU | 15-Jan | 24.4 | IN | 0 |
| MO | 15-Jan | 24.4 | IN | 0 |
| WA | 15-Jan | 24.4 | IN | 0 |
| MS | 15-Jan | 24.4 | IN | 1 |
| MS | 16-Jan | 17.7 | IN | -1 |
| WA | 16-Jan | 17.7 | IN | -1 |
| MS | 16-Jan | 15.2 | OUT | -2 |
| AH | 16-Jan | 23.4 | OUT | -2 |
| WA | 16-Jan | 23.4 | IN | 0 |
| MO | 16-Jan | 23.4 | IN | 0 |
| MS | 16-Jan | 23.4 | IN | 0 |
| MS | 19-Jan | 21.2 | IN | 0 |
| MS | 19-Jan | 17.6 | OUT | -2 |
| AH | 19-Jan | 21.6 | IN | 0 |
| DH | 19-Jan | 21.6 | IN | 0 |
| MS | 19-Jan | 21.6 | IN | 0 |
| WA | 19-Jan | 21.6 | IN | 0 |
| AH | 20-Jan | 22.1 | IN | 0 |
| DH | 20-Jan | 22.1 | IN | 0 |
| MS | 20-Jan | 22.1 | IN | 0 |
| WA | 20-Jan | 22.1 | IN | -1 |
| HU | 20-Jan | 22.1 | IN | 0 |
| DH | 21-Jan | 19.9 | IN | -1 |
| MS | 21-Jan | 18.8 | IN | 0 |
| MS | 21-Jan | 17.3 | OUT | -1 |
| WA | 21-Jan | 17.2 | OUT | -1 |
| DH | 21-Jan | 17.2 | OUT | -1 |
| DH | 21-Jan | 22 | IN | -1 |
| AH | 21-Jan | 15.6 | OUT | -2 |
| MS | 21-Jan | 15.6 | OUT | -2 |
| MS | 23-Jan | 18.3 | IN | -1 |
| AH | 23-Jan | 18.3 | IN | 0 |
| WA | 23-Jan | 18.3 | IN | 0 |
| DH | 23-Jan | 18.3 | IN | 0 |
| MS | 23-Jan | 18.4 | OUT | -2 |
| WA | 23-Jan | 18.4 | OUT | -2 |
| DH | 23-Jan | 18.4 | OUT | -2 |
| AH | 23-Jan | 21.1 | IN | 0 |
| DH | 23-Jan | 21.1 | IN | -1 |
| WA | 23-Jan | 21.1 | IN | 0 |
| AH | 24-Jan | 24.3 | IN | 0 |
| WA | 24-Jan | 24.3 | IN | 0 |
| MS | 24-Jan | 24.3 | IN | 0 |
| MO | 24-Jan | 24.3 | IN | 0 |
| DH | 24-Jan | 24.3 | IN | -1 |
| HU | 24-Jan | 24.3 | IN | 0 |
| DH | 24-Jan | 29 | IN | 1 |
| DH | 24-Jan | 20.1 | OUT | -2 |
| WA | 24-Jan | 20.1 | OUT | -2 |
| MS | 05-Feb | 20.1 | IN | 0 |
| WA | 05-Feb | 20.1 | IN | -1 |
| MS | 05-Feb | 14.3 | OUT | -2 |
| WA | 05-Feb | 14.3 | OUT | -2 |
| AH | 06-Feb | 19.1 | IN | -1 |
| MS | 07-Feb | 23.1 | IN | 0 |
| WA | 07-Feb | 23.1 | IN | 0 |
| AH | 07-Feb | 23.1 | IN | -1 |
| DH | 07-Feb | 23.1 | IN | 0 |
| MO | 07-Feb | 23.1 | IN | 0 |
| MS | 08-Feb | 19.6 | IN | 0 |
| MS | 08-Feb | 19.9 | IN | 0 |
| WA | 08-Feb | 19.9 | IN | 0 |
| AH | 08-Feb | 19.9 | IN | 0 |
| MO | 08-Feb | 19.9 | IN | 0 |
| MS | 08-Feb | 20.8 | OUT | 0 |
| WA | 08-Feb | 20.8 | OUT | -1 |
| AH | 02-Nov | 22.6 | OUT | 0 |
| AH | 02-Nov | 23.5 | IN | 0 |
| MO | 02-Nov | 23.5 | IN | 0 |
| WA | 02-Nov | 23.5 | IN | 0 |
| HU | 02-Nov | 23.5 | IN | 0 |
| AH | 02-Nov | 23.9 | OUT | 0 |
| KA | 27-Oct | 25.1 | IN | 0 |
| G-HU | 27-Oct | 24.8 | IN | 0 |
| G-WA | 27-Oct | 25.3 | IN | 0 |
| G-AH | 27-Oct | 25.5 | IN | 0 |
| ZA | 27-Oct | 25.5 | IN | 0 |
| ZA | 27-Oct | 25.4 | IN | 1 |
| KA | 29-Oct | 24.5 | IN | 1 |
| KA | 29-Oct | 24.9 | IN | 1 |
| G-HU | 29-Oct | 25.3 | IN | 0 |
| G-WA | 29-Oct | 25.4 | IN | 0 |
| G-MA | 29-Oct | 25.5 | IN | 1 |
| ZA | 30-Oct | 25.7 | IN | 0 |
| ZA | 31-Oct | 22.9 | IN | 0 |
| ZA | 01-Nov | 23.4 | IN | 0 |
| KA | 01-Jan | 23.9 | OUT | 0 |
| ZA | 02-Nov | 24.5 | OUT | 0 |
| KA | 03-Nov | 23.7 | IN | 1 |
| ZA | 03-Nov | 23.7 | IN | 0 |
| ZA | 05-Nov | 22.3 | IN | 1 |
| KA | 05-Nov | 22.6 | IN | 0 |
| ZA | 06-Nov | 22.8 | IN | 0 |
| AR | 06-Nov | 22.8 | IN | 0 |
| SA | 06-Nov | 22.8 | IN | 1 |
| G-MA | 06-Nov | 22.8 | IN | 0 |
| G-AL | 06-Nov | 22.8 | IN | -1 |
| G-TH | 06-Nov | 22.8 | IN | 0 |
| G-HU | 06-Nov | 22.8 | IN | 0 |
| G-WA | 06-Nov | 22.8 | IN | 0 |
| AR | 07-Nov | 24.8 | IN | 1 |
| SA | 07-Nov | 24.8 | IN | 1 |
| ZA | 07-Nov | 24.8 | IN | 1 |
| G-MA | 07-Nov | 24.8 | IN | 0 |
| G-AH | 07-Nov | 24.8 | IN | 1 |
| KA | 07-Nov | 24.8 | IN | 1 |
| AR | 08-Nov | 24 | IN | 0 |
| G-MA | 08-Nov | 24 | IN | 0 |
| SA | 08-Nov | 24 | IN | 0 |
| AR | 08-Nov | 22.8 | Out | 0 |
| SA | 08-Nov | 22.8 | Out | 0 |
| G-MA | 08-Nov | 22.8 | Out | 0 |
| G-WA | 09-Nov | 23.6 | IN | 0 |
| ZA | 09-Nov | 23.6 | IN | 0 |
| G-MO | 09-Nov | 23.6 | IN | 0 |
| G-YA | 09-Nov | 23.6 | IN | 1 |
| G-MO | 09-Nov | 23.6 | IN | 0 |
| AR | 09-Nov | 23.6 | IN | 0 |
| KA | 09-Nov | 23.6 | IN | 1 |
| G-MO | 09-Nov | 23.6 | IN | 1 |
| G-EM | 09-Nov | 23.6 | IN | 0 |
| G-LU | 09-Nov | 23.6 | IN | 0 |
| G-BA | 09-Nov | 23.6 | IN | 0 |
| G-HU | 09-Nov | 23.6 | IN | 0 |
| G-SA | 09-Nov | 23.6 | IN | 0 |
| AR | 10-Nov | 21.8 | IN | -1 |
| SA | 10-Nov | 21.8 | IN | -1 |
| ZA | 10-Nov | 21.1 | IN | 0 |
| AR | 11-Nov | 21.7 | IN | 0 |
| ZA | 13-Nov | 20 | IN | -1 |
| ZA | 14-Nov | 20.2 | IN | 0 |
| AR | 15-Nov | 20 | IN | -1 |
| SA | 16-Nov | 15 | IN | -2 |
| AR | 17-Nov | 18.3 | OUT | -1 |
| ZA | 18-Nov | 18.6 | IN | -1 |
| SA | 18-Nov | 19.8 | IN | 0 |
| AR | 18-Nov | 19.8 | IN | 0 |
| KA | 18-Nov | 19.8 | IN | 0 |
| ZA | 18-Nov | 19.8 | IN | 0 |
| SA | 19-Nov | 11.5 | OUT | -1 |
| KA | 19-Nov | 11.5 | OUT | 0 |
| ZA | 20-Nov | 19.6 | IN | 0 |
| SA | 20-Nov | 22 | IN | 0 |
| G-BA | 20-Nov | 22 | IN | 0 |
| G-HU | 20-Nov | 22 | IN | 0 |
| G-YA | 20-Nov | 22 | IN | 0 |
| G-WA | 20-Nov | 22 | IN | 0 |
| G-MO | 20-Nov | 23.2 | IN | 0 |
| AR | 20-Nov | 23.2 | IN | 1 |
| ZA | 25-Nov | 21.5 | IN | 1 |
| K | 25-Nov | 21.5 | IN | 0 |
| G-HU | 25-Nov | 21.5 | IN | -1 |
| SA | 25-Nov | 21.5 | IN | 0 |
| G-AH | 25-Nov | 21.5 | IN | 0 |
| G-BA | 20-Nov | 22.2 | IN | 2 |
| G-MO | 20-Nov | 22.2 | IN | 0 |
| G-MOS | 20-Nov | 22.2 | IN | 0 |
| G-YA | 20-Nov | 22.2 | IN | 0 |
| G-HU | 20-Nov | 22.2 | IN | 0 |
| G-WA | 20-Nov | 22.2 | IN | 0 |
| G-MO | 20-Nov | 22.2 | IN | 0 |
| G-BA | 21-Nov | 24.6 | IN | 0 |
| G-YA | 21-Nov | 22.4 | IN | 0 |
| G-BA | 21-Nov | 22.2 | IN | -1 |
| G-MO | 21-Nov | 22.2 | IN | -1 |
| G-YA | 21-Nov | 22.2 | IN | -1 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INB** | 15-Dec | 18.3 | IN | 0 | AH | 08-Feb | 20.8 | OUT | -1 | G-HU | 21-Nov | 22.1 | IN | -1 |
| **RE** | 15-Dec | 18.3 | IN | 0 | MO | 08-Feb | 20.8 | OUT | 0 | G-YA | 21-Nov | 22.1 | IN | 0 |
| **AL** | 16-Dec | 21.3 | IN | 1 | MS | 11-Feb | 19.2 | IN | 0 | G-WA | 21-Nov | 22.1 | IN | -1 |
| **G-AH2** | 16-Dec | 21.3 | IN | 0 | MO | 11-Feb | 19.2 | IN | -1 | G-BA | 23-Nov | 19.8 | IN | -1 |
| **G-OM** | 16-Dec | 21.3 | IN | 0 | MS | 11-Feb | 19.1 | OUT | -1 | G-MO | 23-Nov | 19.8 | IN | -1 |
| **G-SA** | 16-Dec | 21.3 | IN | 0 | MO | 11-Feb | 19.1 | OUT | -1 | G-WA | 23-Nov | 19.8 | IN | -1 |
| **RE** | 16-Dec | 21.3 | IN | 0 | WA | 11-Feb | 19.1 | OUT | -1 | G-HU | 23-Nov | 19.8 | IN | -1 |
| **MA** | 16-Dec | 21.3 | IN | 0 | MS | 13-Feb | 20.7 | IN | 0 | G-WA | 23-Nov | 19.1 | IN | -2 |
| **INB** | 16-Dec | 21.3 | IN | 0 | WA | 13-Feb | 20.7 | IN | 0 | G-HU | 23-Nov | 19.1 | IN | -1 |
| **AD** | 16-Dec | 21.3 | IN | 0 | MS | 13-Feb | 15.3 | OUT | -1 | G-MO | 23-Nov | 19.1 | IN | -1 |
| **DH** | 16-Dec | 21.3 | IN | 0 | WA | 13-Feb | 15.3 | OUT | -1 | G-MOS | 23-Nov | 19.1 | IN | 0 |
| **ZAA** | 18-Dec | 18 | IN | 0 | AH | 14-Feb | 23.1 | IN | 0 | G-BA | 23-Nov | 19.1 | IN | -1 |
| **G-SA** | 18-Dec | 18 | IN | -1 | WA | 14-Feb | 23.1 | IN | -1 | G-MO | 23-Nov | 20.4 | IN | 0 |
| **INB** | 18-Dec | 18 | IN | 0 | MS | 14-Feb | 23.1 | IN | 0 | G-MOS | 24-Nov | 18.4 | IN | -1 |
| **AD** | 18-Dec | 18 | IN | 0 | DH | 14-Feb | 23.1 | IN | -1 | G-HU | 24-Nov | 18.4 | IN | -1 |
| **G-ZA** | 20-Dec | 15.6 | IN | 0 | AH | 16-Feb | 19 | IN | -2 | G-YA | 24-Nov | 18.4 | IN | 1 |
| **G-SA** | 20-Dec | 15.6 | IN | 1 | MS | 16-Feb | 19 | IN | -1 | G-MOS | 24-Nov | 18.4 | IN | 0 |
| **AD** | 20-Dec | 15.6 | IN | 1 | WA | 16-Feb | 19 | IN | -2 | G-WA | 24-Nov | 18.4 | IN | -2 |
| **INB** | 20-Dec | 15.6 | IN | 0 | MS | 16-Feb | 21.4 | IN | 0 | G-MOS | 24-Nov | 18.4 | IN | -1 |
| **MA** | 20-Dec | 15.6 | IN | 1 | WA | 16-Feb | 21.4 | IN | 0 | G-BA | 24-Nov | 18.4 | IN | -1 |
| **DH** | 20-Dec | 15.6 | IN | 1 | DH | 16-Feb | 21.4 | IN | 0 | G-MO | 25-Nov | 18.2 | IN | 0 |
| **G-ZA** | 20-Dec | 17.1 | OUT | 0 | AH | 17-Feb | 18.4 | IN | -1 | G-BA | 25-Nov | 18.2 | IN | 0 |
| **G-SA** | 20-Dec | 17.1 | OUT | -2 | MS | 17-Feb | 22.9 | IN | 0 | G-YA | 25-Nov | 18.2 | IN | 0 |
| **MA** | 20-Dec | 17.1 | OUT | 0 | AH | 17-Feb | 22.9 | IN | 0 | G-BA | 26-Nov | 15.4 | IN | -2 |
| **INB** | 20-Dec | 17.1 | OUT | 0 | WA | 17-Feb | 22.9 | IN | -1 | G-YA | 26-Nov | 15.4 | IN | -2 |
| **AD** | 20-Dec | 17.1 | OUT | -1 | DH | 17-Feb | 22.9 | IN | -1 | G-MO | 26-Nov | 15.4 | IN | -2 |
| **G-SA** | 21-Dec | 16.5 | OUT | -2 | MS | 18-Feb | 19.3 | IN | -1 | G-BA | 28-Nov | 21.3 | IN | -1 |
| **INB** | 21-Dec | 16.5 | OUT | -1 | WA | 18-Feb | 19.3 | IN | -1 | G-WA | 28-Nov | 21.3 | IN | -1 |
| **G-ZA** | 21-Dec | 16.5 | OUT | 0 | MS | 18-Feb | 9.7 | IN | -1 | G-HU | 28-Nov | 21.3 | IN | -1 |
| **MA** | 21-Dec | 16.5 | OUT | -1 | WA | 18-Feb | 9.7 | IN | 0 | G-MO | 28-Nov | 21.3 | IN | 0 |
| **AL** | 22-Dec | 18.4 | IN | 0 | MS | 18-Feb | 18.6 | OUT | -2 | G-YA | 28-Nov | 21.3 | IN | 0 |
| **RE** | 22-Dec | 18.4 | IN | 0 | WA | 18-Feb | 18.6 | OUT | -2 | G-MOF | 30-Nov | 19.7 | IN | 0 |
| **AD** | 22-Dec | 18.4 | IN | 0 | AH | 18-Feb | 18.6 | OUT | -1 | G-SA | 30-Nov | 19.7 | IN | 0 |
| **DH** | 22-Dec | 18.4 | IN | 0 | MS | 01-Mar | 20.6 | IN | -1 | G-BA | 30-Nov | 19.7 | IN | 1 |
| **INB** | 22-Dec | 18.4 | IN | 0 | AH | 01-Mar | 20.6 | IN | 0 | G-NS | 30-Nov | 19.7 | IN | 0 |
| **MA** | 22-Dec | 18.4 | IN | 0 | MO | 01-Jan | 20.6 | IN | 0 | G-HU | 30-Nov | 19.7 | IN | 1 |
| **G-AH** | 22-Dec | 18.4 | IN | 0 | WA | 01-Jan | 20.6 | IN | -1 | G-ZA | 30-Nov | 19.7 | IN | 0 |
| **AL** | 16-Dec | 21.3 | IN | 1 | MS | 03-Jan | 23.8 | IN | 1 | G-AH | 30-Nov | 19.7 | IN | 2 |
| **G-AH2** | 16-Dec | 21.3 | IN | 0 | AH | 03-Jan | 23.8 | IN | 0 | G-KA | 30-Nov | 19.7 | IN | 2 |
| **G-OM** | 16-Dec | 21.3 | IN | 0 | MO | 03-Jan | 23.8 | IN | 0 | G-YA | 30-Nov | 19.7 | IN | 0 |
| **G-SA** | 16-Dec | 21.3 | IN | 0 | WA | 03-Jan | 23.8 | IN | 0 | G-MOS | 30-Nov | 19.7 | IN | -1 |
| **RE** | 16-Dec | 21.3 | IN | 0 | DH | 03-Jan | 23.8 | IN | 0 | G-YA | 03-Dec | 17.2 | IN | -1 |
| **MA** | 16-Dec | 21.3 | IN | 0 | MS | 04-Jan | 24.2 | IN | 1 | G-BA | 03-Dec | 17.2 | IN | -2 |
| **INB** | 16-Dec | 21.3 | IN | 0 | AH | 04-Jan | 24.2 | IN | 1 | G-AL | 04-Dec | 22.5 | IN | -1 |
| **AD** | 16-Dec | 21.3 | IN | 0 | MO | 04-Jan | 24.2 | IN | 1 | G-TH | 04-Dec | 22.5 | IN | 0 |
| **DH** | 16-Dec | 21.3 | IN | 0 | WA | 04-Jan | 24.2 | IN | 0 | G-AL | 14-Dec | 17.8 | IN | 0 |
| **ZAA** | 18-Dec | 18 | IN | 0 | MS | 04-Jan | 24.8 | IN | 1 | AR | 14-Dec | 17.8 | IN | 0 |
| **G-SA** | 18-Dec | 18 | IN | -1 | AH | 04-Jan | 24.8 | IN | 1 | G-RE | 14-Dec | 17.8 | IN | 0 |
| **INB** | 18-Dec | 18 | IN | 0 | MO | 04-Jan | 24.8 | IN | 0 | G-AH | 14-Dec | 17.8 | IN | 0 |
| **AD** | 18-Dec | 18 | IN | 0 | WA | 04-Jan | 24.8 | IN | -1 | G-AH2 | 14-Dec | 17.8 | IN | 0 |
| **G-ZA** | 20-Dec | 15.6 | IN | 0 | MS | 05-Jan | 22.7 | IN | 0 | KA | 25-Dec | 17.2 | IN | 0 |
| **G-SA** | 20-Dec | 15.6 | IN | 1 | AH | 05-Jan | 22.7 | IN | 0 | AR | 25-Dec | 17.2 | IN | 0 |
| **AD** | 20-Dec | 15.6 | IN | 1 | MS | 07-Mar | 23.4 | IN | 0 | G-MA | 25-Dec | 17.2 | IN | 0 |
| **INB** | 20-Dec | 15.6 | IN | 0 | AH | 07-Mar | 23.4 | IN | 0 | KA | 27-Dec | 15.9 | IN | -1 |
| **MA** | 20-Dec | 15.6 | IN | 1 | WA | 07-Mar | 23.4 | IN | -1 | AR | 27-Dec | 15.9 | IN | -1 |
| **DH** | 20-Dec | 15.6 | IN | 1 | MS | 07-Mar | 23.4 | IN | -1 | G-AH | 27-Dec | 15.9 | IN | -1 |
| **AL** | 27-Dec | 18.2 | IN | 0 | MS | 08-Mar | 22.1 | IN | 0 | KA | 28-Dec | 10.4 | OUT | -2 |
| **AD** | 27-Dec | 18.2 | IN | 0 | AH | 08-Mar | 22.1 | IN | 0 | AR | 28-Dec | 10.4 | OUT | -2 |
| **DH** | 27-Dec | 18.2 | IN | 0 | WA | 08-Mar | 22.1 | IN | 0 | G-AH | 28-Dec | 10.4 | OUT | -1 |
| **RE** | 27-Dec | 18.2 | IN | 0 | MS | 09-Mar | 24.7 | IN | 1 | KA | 28-Dec | 15.3 | IN | 0 |
| **INB** | 27-Dec | 18.2 | IN | 0 | AH | 09-Mar | 24.7 | IN | 0 | AR | 28-Dec | 15.3 | IN | 0 |
| **AL** | 28-Dec | 12.5 | OUT | -1 | WA | 09-Mar | 24.7 | IN | -1 | KA | 29-Dec | 17.4 | IN | 1 |
| **AD** | 28-Dec | 12.5 | OUT | -2 | DH | 09-Mar | 24.7 | IN | -1 | AR | 29-Dec | 17.4 | IN | 0 |
| **AL** | 28-Dec | 19.7 | IN | 0 | MS | 10-Mar | 22.8 | OUT | 0 | G-AH | 29-Dec | 17.4 | IN | 0 |
| **AD** | 28-Dec | 19.7 | IN | 0 | AH | 10-Mar | 22.8 | OUT | 0 | G-HU | 29-Dec | 17.4 | IN | -1 |
| **RE** | 28-Dec | 19.7 | IN | 0 | MO | 10-Mar | 22.8 | OUT | 0 | G-WA | 29-Dec | 17.4 | IN | -1 |
| **MA** | 28-Dec | 19.7 | IN | 1 | WA | 10-Mar | 22.8 | OUT | 0 | KA | 30-Dec | 18.1 | IN | 2 |
| **INB** | 28-Dec | 19.7 | IN | 0 | MS | 11-Mar | 22.1 | IN | 0 | AR | 30-Dec | 18.1 | IN | 0 |
| **DH** | 28-Dec | 19.7 | IN | -1 | WA | 11-Mar | 22.1 | IN | 0 | G-AH | 30-Dec | 18.1 | IN | 0 |
| **G-SA** | 28-Dec | 19.7 | IN | 0 | DH | 11-Mar | 22.1 | IN | -1 | G-HU | 30-Dec | 18.1 | IN | 0 |
| **ZAA** | 28-Dec | 19.7 | IN | 0 | HU | 11-Mar | 22.1 | IN | 0 | G-WA | 30-Dec | 18.1 | IN | -2 |
| **AL** | 29-Dec | 18.3 | OUT | -1 | AH | 11-Mar | 22.1 | IN | 0 | KA | 31-Dec | 17.9 | IN | 0 |
| **G-SA** | 29-Dec | 18.3 | OUT | -1 | MS | 11-Mar | 22.1 | IN | 0 | AR | 31-Dec | 17.9 | IN | 0 |
| **RE** | 29-Dec | 18.3 | OUT | 0 | WA | 11-Mar | 22.1 | IN | 0 | G-AH | 31-Dec | 17.9 | IN | 0 |
| **MA** | 29-Dec | 18.3 | OUT | 0 | MS | 13-Mar | 21.9 | IN | -1 | KA | 02-Jan | 15.8 | IN | -1 |
| **AL** | 29-Dec | 19.9 | IN | 1 | AH | 13-Mar | 21.9 | IN | -1 | AR | 02-Jan | 15.8 | IN | -2 |
| **G-SA** | 29-Dec | 19.9 | IN | 0 | MS | 13-Mar | 23.1 | IN | 0 | G-AH 2 | 02-Jan | 15.8 | IN | -1 |
| **G-ZA** | 29-Dec | 19.9 | IN | 1 | WA | 13-Mar | 23.1 | IN | 0 | G-AH | 02-Jan | 15.8 | IN | -1 |
| **MA** | 29-Dec | 19.9 | IN | 1 | MO | 13-Mar | 23.1 | IN | 0 | G-MA | 02-Jan | 15.8 | IN | -1 |
| **INB** | 29-Dec | 19.9 | IN | 1 | MS | 12-May | 21.7 | IN | 0 | KA | 05-Jan | 17.7 | IN | 0 |
| **RE** | 29-Dec | 19.9 | IN | 0 | WA | 13-Mar | 21.7 | IN | 0 | AR | 05-Jan | 17.7 | IN | -1 |
| **AD** | 29-Dec | 19.9 | IN | 0 | AH | 13-Mar | 21.7 | IN | 0 | G-AH | 05-Jan | 17.7 | IN | -1 |
| **ZAA** | 29-Dec | 19.9 | IN | 0 | MS | 14-Mar | 22.3 | IN | 0 | KA | 06-Jan | 16.2 | IN | -1 |
| **DH** | 29-Dec | 19.9 | IN | 0 | WA | 14-Mar | 22.3 | IN | -1 | AR | 06-Jan | 16.2 | IN | -1 |
| **AL** | 31-Dec | 20.1 | OUT | 0 | AH | 14-Mar | 22.3 | IN | 0 | G-AH | 06-Jan | 16.2 | IN | -1 |
| **AD** | 31-Dec | 20.1 | OUT | 0 | MO | 14-Mar | 22.3 | IN | 0 | KA | 07-Jan | 16.7 | OUT | -1 |
| **INB** | 31-Dec | 20.1 | OUT | 0 | MS | 19-Mar | 22.2 | IN | 0 | AR | 07-Jan | 16.7 | OUT | -2 |
| **MA** | 31-Dec | 20.1 | OUT | 0 | WA | 19-Mar | 22.2 | IN | -1 | G-AH | 07-Jan | 16.7 | OUT | -1 |
| **AL** | 31-Dec | 20.1 | IN | 0 | MS | 19-Mar | 23.8 | IN | 0 | KA | 07-Jan | 15.2 | IN | -1 |
| **MA** | 31-Dec | 20.2 | IN | 0 | WA | 19-Mar | 23.8 | IN | -1 | AR | 07-Jan | 15.2 | IN | -1 |
| **INB** | 31-Dec | 20.2 | IN | 0 | AH | 19-Mar | 23.8 | IN | 0 | G-AH | 07-Jan | 15.2 | IN | -1 |
| **AD** | 31-Dec | 20.2 | IN | 0 | MS | 20-Mar | 24.3 | OUT | 0 | KA | 08-Jan | 14.7 | IN | 0 |
| **RE** | 31-Dec | 20.2 | IN | 0 | WA | 20-Mar | 24.3 | OUT | 0 | AR | 08-Jan | 14.7 | IN | -1 |
| **ZAA** | 31-Dec | 20.2 | IN | 0 | MO | 20-Mar | 24.3 | OUT | 0 | G-AH | 08-Jan | 14.7 | IN | -1 |
| **AL** | 01-Jan | 18.2 | IN | -1 | MS | 20- | 24.1 | IN | 0 | AR | 09-Jan | 20.3 | OUT | 0 |
| **INB** | 01-Jan | 18.2 | IN | 0 | WA | 20-Mar | 24.1 | IN | 0 | KA | 09-Jan | 15.8 | IN | -1 |
| **MA** | 01-Jan | 18.2 | IN | 1 | MS | 21-Mar | 25.2 | OUT | 0 | AR | 09-Jan | 15.8 | IN | -1 |
| **AL** | 02-Jan | 15.1 | IN | -1 | HU | 21-Mar | 25.2 | OUT | 0 | G-AH | 09-Jan | 15.8 | IN | -1 |
| **DH** | 02-Jan | 15.1 | IN | -2 | MO | 21-Mar | 25.2 | OUT | 0 | KA | 15-Jan | 13.7 | IN | 0 |
| **RE** | 02-Jan | 15.1 | IN | -2 | DH | 21-Mar | 25.2 | OUT | 0 | AR | 15-Jan | 13.7 | IN | 0 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ZAA** | 02-Jan | 15.1 | IN | -2 | WA | 21-Mar | 25.2 | OUT | 0 | AG-AH | 15-Jan | 13.7 | IN | 0 |
| **MA** | 02-Jan | 15.1 | IN | -2 | MS | 21-Mar | 24.9 | IN | 0 | KA | 17-Jan | 13.2 | IN | 0 |
| **INB** | 02-Jan | 15.1 | IN | -2 | WA | 21-Mar | 24.9 | IN | 0 | A | 17-Jan | 13.2 | IN | -1 |
| **AL** | 05-Jan | 17.3 | IN | -1 | DH | 21-Mar | 24.9 | IN | 0 | G-AH | 17-Jan | 13.2 | IN | 0 |
| **G-SA** | 05-Jan | 17.3 | IN | -1 | MO | 21-Mar | 24.9 | IN | 0 | G-AH 2 | 17-Jan | 13.2 | IN | 0 |
| **G-ZA** | 05-Jan | 17.3 | IN | 0 | HU | 21-Mar | 24.9 | IN | 0 | KA | 21-Jan | 16.1 | IN | 0 |
| **MA** | 05-Jan | 17.3 | IN | 1 | MS | 28-Mar | 24 | IN | 0 | A | 21-Jan | 16.1 | IN | 0 |
| **INB** | 05-Jan | 17.3 | IN | 0 | WA | 28-Mar | 24 | IN | 0 | KA | 22-Jan | 15.7 | IN | 0 |
| **DH** | 05-Jan | 17.3 | IN | -3 | HU | 28-Mar | 24 | IN | 0 | AR | 22-Jan | 15.7 | IN | 0 |
| **RE** | 05-Jan | 17.3 | IN | 0 | MS | 06-Apr | 23.8 | IN | 0 | G-AH 2 | 22-Jan | 15.7 | IN | 0 |
| **A** | 05-Jan | 17.3 | IN | -2 | MS | 06-Apr | 24.8 | IN | 0 | AR | 24-Jan | 18.9 | OUT | 0 |
| **AL** | 08-Jan | 16.9 | IN | -1 | HU | 06-Apr | 24.8 | IN | 0 | G-MA | 24-Jan | 18.9 | OUT | -1 |
| **MA** | 08-Jan | 16.9 | IN | 0 | MS | 06-Apr | 27.7 | OUT | 0 | SA | 24-Jan | 18.9 | OUT | -1 |
| **RE** | 08-Jan | 16.9 | IN | 0 | MS | 08-Apr | 25.1 | IN | 0 | AR | 25-Jan | 17.7 | IN | 0 |
| **DH** | 08-Jan | 16.9 | IN | -3 | WA | 08-Apr | 25.1 | IN | 0 | ZA | 25-Jan | 17.7 | IN | 0 |
| **INB** | 08-Jan | 16.9 | IN | -1 | HU | 08-Apr | 25.1 | IN | 0 | SA | 25-Jan | 17.7 | IN | 0 |
| **ZAA** | 08-Jan | 16.9 | IN | -3 | AH | 08-Apr | 25.1 | IN | 0 | KA | 25-Jan | 17.7 | IN | 0 |
| **AL** | 09-Jan | 14.4 | IN | -3 | MS | 13-Apr | 23.2 | IN | 0 | AR | 27-Jan | 15.1 | IN | 0 |
| **MA** | 09-Jan | 14.4 | IN | -3 | WA | 13-Apr | 23.2 | IN | 0 | SA | 27-Jan | 15.1 | IN | -1 |
| **AD** | 09-Jan | 14.4 | IN | -3 | HU | 13-Apr | 23.2 | IN | 0 | KA | 27-Jan | 15.1 | IN | 1 |
| **AL** | 12-Jan | 7.7 | IN | -1 | MS | 13-Apr | 20.8 | OUT | -1 | AR | 01-Feb | 14.8 | IN | 0 |
| **RE** | 12-Jan | 7.7 | IN | 0 | HU | 13-Apr | 20.8 | OUT | -1 | SA | 01-Feb | 14.8 | IN | 0 |
| **MA** | 12-Jan | 7.7 | IN | 0 | WA | 13-Apr | 20.8 | OUT | -1 | KA | 01-Feb | 14.8 | IN | 1 |
| **INB** | 12-Jan | 7.7 | IN | 1 | MS | 16-Apr | 22.8 | IN | -1 | AR | 02-Feb | 11.8 | OUT | -3 |
| **G-ZA** | 12-Jan | 7.7 | IN | 0 | WA | 16-Apr | 22.8 | IN | -1 | SA | 02-Feb | 11.8 | OUT | -3 |
| **G-SA** | 12-Jan | 7.7 | IN | -1 | DH | 19-May | 28.4 | IN | 0 | KA | 02-Feb | 11.8 | OUT | -2 |
| **AD** | 12-Jan | 7.7 | IN | 0 | MS | 19-May | 28.7 | IN | 0 | KA | 03-Feb | 18.4 | IN | 1 |
| **DH** | 12-Jan | 7.7 | IN | -2 | AH | 21-May | 28.2 | IN | 1 | AR | 03-Feb | 18.4 | IN | 0 |
| **ZAA** | 12-Jan | 7.7 | IN | 0 | AH | 21-May | 28.5 | IN | 0 | G-INB | 03-Feb | 18.4 | IN | -1 |
| **AL** | 13-Jan | 16.1 | IN | -1 | HU | 21-May | 28.5 | IN | 2 | SA | 03-Feb | 18.4 | IN | -2 |
| **INB** | 13-Jan | 16.1 | IN | -1 | WA | 21-May | 28.5 | IN | 1 | G-AL | 03-Feb | 18.4 | IN | -1 |
| **RE** | 13-Jan | 16.1 | IN | -1 | MS | 21-May | 28.5 | IN | 1 | AR | 04-Feb | 17.4 | OUT | 0 |
| **G-SA** | 13-Jan | 16.1 | IN | -1 | DH | 21-May | 28.1 | IN | 0 | SA | 04-Feb | 17.4 | OUT | 0 |
| **G-ZA** | 13-Jan | 16.1 | IN | 0 | AH | 21-May | 28.1 | IN | 0 | KA | 04-Feb | 17.4 | OUT | 0 |
| **MA** | 13-Jan | 16.1 | IN | -3 | WA | 21-May | 28.1 | IN | 0 | G-INB | 04-Feb | 17.4 | OUT | 0 |
| **AD** | 13-Jan | 16.1 | IN | -2 | MS | 21-May | 28.1 | IN | 0 | G-AL | 04-Feb | 17.4 | OUT | 0 |
| **AL** | 16-Jan | 15.3 | IN | -1 | AH | 24-May | 26.7 | IN | 0 | AR | 05-Feb | 17 | IN | 0 |
| **MA** | 16-Jan | 15.3 | IN | 0 | MS | 24-May | 26.7 | IN | 0 | SA | 05-Feb | 17 | IN | 1 |
| **INB** | 16-Jan | 15.3 | IN | 0 | MS | 24-May | 28.6 | IN | 0 | G-AH | 05-Feb | 17 | IN | 0 |
| **ZAA** | 16-Jan | 15.3 | IN | 0 | WA | 24-May | 28.6 | IN | 0 | G-AL | 05-Feb | 17 | IN | -1 |
| **AL** | 19-Jan | 8.2 | OUT | -3 | AH | 24-May | 28.6 | IN | 0 | G-HU | 05-Feb | 17 | IN | -1 |
| **MA** | 19-Jan | 8.2 | OUT | -3 | DH | 24-May | 28.6 | IN | 0 | G-KA | 05-Feb | 17 | IN | 2 |
| **G-SA** | 19-Jan | 8.2 | OUT | -3 | HU | 24-May | 28.6 | IN | 0 | G-WA | 05-Feb | 17 | IN | 0 |
| **G-ZA** | 19-Jan | 8.2 | OUT | -3 | MS | 08-Jun | 30.2 | OUT | 0 | G-INB | 05-Feb | 17 | IN | 0 |
| **AD** | 19-Jan | 8.2 | OUT | -3 | WA | 08-Jun | 30.2 | OUT | 1 | G-MA | 05-Feb | 17 | IN | 0 |
| **DH** | 19-Jan | 8.2 | OUT | -3 | AH | 08-Jun | 30.2 | OUT | 1 | G-AH | 05-Feb | 17 | IN | 0 |
| **INB** | 19-Jan | 8.2 | OUT | -3 | DH | 08-Jun | 30.2 | OUT | 0 | G-AL | 06-Feb | 18.4 | IN | 0 |
| **AL** | 19-Jan | 18.4 | IN | 0 | AH | 12-Jun | 29.6 | IN | 1 | G-INB | 06-Feb | 18.4 | IN | 0 |
| **G-SA** | 19-Jan | 18.4 | IN | -1 | MS | 12-Jun | 29.6 | IN | 1 | G-WA | 06-Feb | 18.4 | IN | -1 |
| **G-ZA** | 19-Jan | 18.4 | IN | 0 | MO | 12-Jun | 29.6 | IN | 0 | G-HU | 06-Feb | 18.4 | IN | -1 |
| **INB** | 19-Jan | 18.4 | IN | -1 | WA | 12-Jun | 29.6 | IN | 0 | G-AH | 06-Feb | 18.4 | IN | 0 |
| **MA** | 19-Jan | 18.4 | IN | 0 | HU | 12-Jun | 29.6 | IN | 0 | G-MA | 06-Feb | 18.4 | IN | -1 |
| **RE** | 19-Jan | 18.4 | IN | -1 | AH | 12-Jun | 29.1 | IN | 1 | G-AH 2 | 06-Feb | 18.4 | IN | 0 |
| **DH** | 19-Jan | 18.4 | IN | -3 | WA | 12-Jun | 29.1 | IN | 1 | G-AL | 07-Feb | 15.8 | IN | -1 |
| **AD** | 19-Jan | 18.4 | IN | -3 | MS | 12-Jun | 29.1 | IN | 1 | G-INB | 07-Feb | 15.8 | IN | 0 |
| **AL** | 20-Jan | 13.2 | IN | -2 | HU | 12-Jun | 29.1 | IN | 1 | G-MA | 07-Feb | 15.8 | IN | -3 |
| **G-SA** | 20-Jan | 13.2 | IN | -2 | DH | 12-Jun | 29.1 | IN | 1 | G-WA | 07-Feb | 15.8 | IN | -2 |
| **G-ZA** | 20-Jan | 13.2 | IN | -1 | MO | 12-Jun | 29.1 | IN | 0 | G-HU | 07-Feb | 15.8 | IN | 0 |
| **INB** | 20-Jan | 13.2 | IN | -2 | AH | 14-Jun | 29.5 | IN | 0 | G-AH | 07-Feb | 15.8 | IN | 0 |
| **RE** | 20-Jan | 13.2 | IN | -2 | MS | 14-Jun | 29.5 | IN | 0 | G-MA | 13-Feb | 17.6 | IN | 0 |
| **AD** | 20-Jan | 13.2 | IN | -3 | MO | 14-Jun | 29.5 | IN | 0 | SA | 13-Feb | 17.6 | IN | -1 |
| **DH** | 20-Jan | 13.2 | IN | -3 | DH | 14-Jun | 29.5 | IN | 0 | AR | 13-Feb | 17.6 | IN | -1 |
| **ZAA** | 20-Jan | 13.2 | IN | -3 | AH | 17-Jun | 29.3 | IN | 0 | G-AH | 13-Feb | 17.6 | IN | -1 |
| **AL** | 21-Jan | 14.2 | IN | -2 | WA | 17-Jun | 29.3 | IN | 1 | SA | 13-Feb | 17.6 | IN | -2 |
| **DH** | 21-Jan | 14.2 | IN | -3 | MS | 17-Jun | 29.3 | IN | 1 | KA | 13-Feb | 14.1 | OUT | -2 |
| **ZAA** | 21-Jan | 14.2 | IN | -3 | MO | 17-Jun | 29.3 | IN | 0 | AR | 13-Feb | 14.1 | OUT | -2 |
| **INB** | 21-Jan | 14.2 | IN | -1 | DH | 17-Jun | 29.3 | IN | 1 | G-AH | 13-Feb | 14.1 | OUT | -3 |
| **RE** | 21-Jan | 14.2 | IN | -3 | HU | 17-Jun | 29.3 | IN | 1 | SA | 13-Feb | 14.1 | OUT | -3 |
| **AL** | 23-Jan | 14.3 | IN | -3 | AH | 18-Jun | 29.5 | IN | 1 | AR | 14-Feb | 16.8 | OUT | -1 |
| **RE** | 23-Jan | 14.3 | IN | -3 | AH | 23-Jun | 27.9 | IN | 0 | KA | 14-Feb | 16.8 | OUT | 0 |
| **MA** | 23-Jan | 14.3 | IN | -1 | MS | 23-Jun | 27.9 | IN | 0 | SA | 14-Feb | 16.8 | OUT | -2 |
| **ZAA** | 23-Jan | 14.3 | IN | -3 | WA | 23-Jun | 27.9 | IN | 0 | G-AH | 14-Feb | 16.8 | OUT | -1 |
| **DH** | 23-Jan | 14.3 | IN | -3 | MO | 23-Jun | 27.9 | IN | 0 | AR | 16-Feb | 19.4 | IN | 0 |
| **AD** | 23-Jan | 14.3 | IN | -3 | AH | 24-Jun | 28.8 | IN | 1 | SA | 16-Feb | 19.4 | IN | 0 |
| **AL** | 24-Jan | 15.8 | IN | 0 | WA | 24-Jun | 28.8 | IN | 0 | KA | 16-Feb | 19.4 | IN | 0 |
| **AD** | 24-Jan | 15.8 | IN | -2 | MS | 24-Jun | 28.8 | IN | 1 | AR | 17-Feb | 17.7 | IN | 0 |
| **INB** | 24-Jan | 15.8 | IN | 0 | MO | 24-Jun | 28.8 | IN | 1 | KA | 17-Feb | 17.7 | IN | -1 |
| **MA** | 24-Jan | 15.8 | IN | -1 | HU | 24-Jun | 28.8 | IN | 1 | SA | 17-Feb | 17.7 | IN | 0 |
| **DH** | 24-Jan | 15.8 | IN | -2 | DH | 24-Jun | 28.8 | IN | 1 | G-AL | 19-Feb | 22.2 | IN | 0 |
| **RE** | 24-Jan | 15.8 | IN | -1 | AH | 28-Jun | 28.9 | IN | 0 | G-AH | 19-Feb | 22.2 | IN | 0 |
| **ZAA** | 24-Jan | 15.8 | IN | -2 | MS | 28-Jun | 28.9 | IN | 0 | G-WA | 19-Feb | 22.2 | IN | 0 |
| **AL** | 26-Jan | 16.1 | IN | -1 | AH | 07-Jul | 29.9 | IN | 0 | G-HU | 19-Feb | 22.2 | IN | 0 |
| **DH** | 26-Jan | 16.1 | IN | -3 | MS | 07-Jul | 29.9 | IN | 1 | SA | 19-Feb | 22.2 | IN | 0 |
| **RE** | 26-Jan | 16.1 | IN | -1 | WA | 07-Jul | 29.9 | IN | 0 | KA | 19-Feb | 22.2 | IN | 1 |
| **INB** | 26-Jan | 16.1 | IN | 0 | MO | 07-Jul | 29.9 | IN | 1 | AR | 19-Feb | 22.2 | IN | 0 |
| **MA** | 26-Jan | 16.1 | IN | 0 | AH | 09-Jul | 30.2 | IN | 2 | AR | 20-Feb | 17.9 | OUT | 0 |
| **G-ZA** | 26-Jan | 16.1 | IN | 0 | WA | 09-Jul | 30.2 | IN | 2 | SA | 20-Feb | 17.9 | OUT | -1 |
| **AL** | 30-Jan | 13.2 | IN | -3 | MO | 09-Jul | 30.2 | IN | 2 | G-AL | 20-Feb | 17.9 | OUT | 0 |
| **DH** | 30-Jan | 13.2 | IN | -3 | AH | 09-Jul | 32.4 | OUT | 1 | AR | 22-Feb | 19.2 | IN | 0 |
| **MA** | 30-Jan | 13.2 | IN | -3 | AH | 10-Jul | 38.1 | IN | 1 | KA | 22-Feb | 19.2 | IN | 0 |
| **G-AH** | 30-Jan | 13.2 | IN | -2 | WA | 10-Jul | 38.1 | IN | 2 | SA | 22-Feb | 19.2 | IN | -2 |
| **RE** | 30-Jan | 13.2 | IN | -3 | AH | 10-Jul | 39.1 | OUT | 2 | AR | 24-Feb | 14.9 | OUT | -1 |
| **INB** | 30-Jan | 13.2 | IN | -3 | AH | 10-Jul | 30.9 | OUT | 1 | SA | 24-Feb | 14.9 | OUT | -2 |
| **ZAA** | 30-Jan | 13.2 | IN | -3 | MS | 10-Jul | 30.9 | OUT | 2 | KA | 24-Feb | 14.9 | OUT | 0 |
| **AD** | 30-Jan | 13.2 | IN | -3 | WA | 10-Jul | 30.9 | OUT | 1 | AR | 25-Feb | 19.4 | IN | 0 |
| **AL** | 30-Jan | 4.6 | OUT | -3 | AH | 11-Jul | 29.7 | OUT | 1 | SA | 25-Feb | 19.4 | IN | 0 |
| **INB** | 30-Jan | 4.6 | OUT | -3 | WA | 11-Jul | 29.7 | IN | 1 | G-MA | 25-Feb | 19.4 | IN | 0 |
| **AL** | 30-Jan | 12.7 | IN | -3 | MS | 11-Jul | 29.7 | IN | 1 | AR | 26-Feb | 21 | IN | 1 |
| **INB** | 30-Jan | 12.7 | IN | -3 | DH | 11-Jul | 29.7 | IN | 1 | M | 26-Feb | 21 | IN | 0 |
| **AL** | 11-Feb | 19.1 | IN | 0 | MO | 11-Jul | 29.7 | IN | 1 | SA | 26-Feb | 21 | IN | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DH** | 11-Feb | 19.1 | IN | -1 | AH | 15-Jul | 30.4 | IN | 3 | KA | 26-Feb | 21 | IN | 0 |
| **INB** | 11-Feb | 19.1 | IN | 0 | MO | 15-Jul | 30.4 | IN | 1 | AR | 28-Feb | 19 | IN | 0 |
| **AD** | 11-Feb | 19.1 | IN | 0 | MS | 15-Jul | 30.4 | IN | 2 | G-AH | 28-Feb | 19 | IN | 0 |
| **RE** | 11-Feb | 19.1 | IN | 0 | HU | 15-Jul | 30.4 | IN | 2 | SA | 28-Feb | 19 | IN | 0 |
| **MA** | 11-Feb | 19.1 | IN | 0 | WA | 15-Jul | 30.4 | IN | 3 | KA | 28-Feb | 19 | IN | 1 |
| **ZAA** | 11-Feb | 19.1 | IN | -2 | DH | 15-Jul | 30.4 | IN | 2 | SA | 03-Mar | 19.8 | IN | 0 |
| **AL** | 15-Feb | 15.7 | IN | -1 | AH | 15-Jul | 32.8 | OUT | 2 | KA | 03-Mar | 19.8 | IN | 1 |
| **AD** | 15-Feb | 15.7 | IN | -2 | MS | 15-Jul | 32.8 | OUT | 2 | G-HU | 03-Mar | 19.8 | IN | 0 |
| **RE** | 15-Feb | 15.7 | IN | -2 | HU | 16-Jul | 29.4 | IN | 2 | G-WA | 03-Mar | 19.8 | IN | 0 |
| **MA** | 15-Feb | 15.7 | IN | -1 | AH | 16-Jul | 29.4 | IN | 0 | SA | 05-Mar | 21.9 | IN | 2 |
| **INB** | 15-Feb | 15.7 | IN | -1 | MS | 16-Jul | 29.4 | IN | 0 | SA | 11-Mar | 31.2 | OUT | 0 |
| **DH** | 15-Feb | 15.7 | IN | -2 | WA | 16-Jul | 29.4 | IN | 1 | G-MA | 11-Mar | 31.2 | OUT | 0 |
| **BA** | 05-Feb | 19.3 | IN | -2 | YA | 10-Apr | 22.7 | OUT | 0 | MO | 02-Jul | 27.8 | IN | 0 |
| **MO** | 05-Feb | 19.3 | IN | -1 | MO | 10-Apr | 24.5 | IN | 0 | BA | 02-Jul | 27.8 | IN | 0 |
| **YA** | 05-Feb | 19.3 | IN | -1 | BA | 10-Apr | 24.5 | IN | 0 | YA | 02-Jul | 27.8 | IN | 0 |
| **MO** | 07-Feb | 19.5 | IN | -1 | YA | 10-Apr | 24.5 | IN | 0 | MO | 03-Jul | 30.4 | IN | 3 |
| **YA** | 07-Feb | 19.5 | IN | 0 | MO | 10-Apr | 25.5 | IN | 1 | BA | 03-Jul | 30.4 | IN | 2 |
| **BA** | 07-Feb | 19.5 | IN | 0 | BA | 10-Apr | 25.5 | IN | 0 | YA | 03-Jul | 30.4 | IN | 3 |
| **MO** | 11-Feb | 18.3 | IN | 0 | YA | 10-Apr | 25.5 | IN | 1 | MO | 03-Jul | 42.9 | OUT | 3 |
| **BA** | 11-Feb | 18.3 | IN | 0 | G-AB | 10-Apr | 25.5 | IN | 1 | BA | 03-Jul | 42.9 | OUT | 3 |
| **YA** | 11-Feb | 18.3 | IN | 0 | MO | 16-Apr | 21.7 | IN | -1 | YA | 03-Jul | 42.9 | OUT | 3 |
| **MO** | 12-Feb | 18.7 | IN | 0 | BA | 16-Apr | 21.7 | IN | -1 | G-MOY | 03-Jul | 42.9 | OUT | 3 |
| **BA** | 12-Feb | 18.7 | IN | -1 | YA | 16-Apr | 21.7 | IN | -1 | G-MOS | 03-Jul | 42.9 | OUT | 3 |
| **YA** | 12-Feb | 18.7 | IN | -1 | MO | 16-Apr | 22.3 | IN | 0 | G-EM | 03-Jul | 42.9 | OUT | 3 |
| **G-AB** | 12-Feb | 20.3 | IN | 0 | BA | 16-Apr | 22.3 | IN | 1 | MO | 03-Jul | 27.3 | IN | 0 |
| **MO** | 12-Feb | 20.3 | IN | 0 | YA | 16-Apr | 22.3 | IN | 0 | BA | 03-Jul | 27.3 | IN | 0 |
| **G-AS** | 12-Feb | 20.3 | IN | 0 | MO | 17-Apr | 22.1 | IN | 0 | YA | 03-Jul | 27.3 | IN | 0 |
| **BA** | 12-Feb | 20.3 | IN | 0 | BA | 17-Apr | 22.1 | IN | -1 | G-MOY | 03-Jul | 27.3 | IN | 0 |
| **YA** | 12-Feb | 20.3 | IN | 0 | YA | 17-Apr | 22.1 | IN | 0 | G-MOS | 03-Jul | 27.3 | IN | 0 |
| **MO** | 14-Feb | 18.3 | IN | 0 | MO | 18-Apr | 21.4 | IN | -1 | G-EM | 03-Jul | 27.3 | IN | 0 |
| **BA** | 14-Feb | 18.3 | IN | -1 | BA | 18-Apr | 21.4 | IN | -1 | MO | 04-Jul | 44.7 | OUT | 3 |
| **YA** | 14-Feb | 18.3 | IN | 0 | YA | 18-Apr | 21.4 | IN | -1 | BA | 04-Jul | 44.7 | OUT | 3 |
| **G-MOS** | 17-Feb | 19.1 | IN | 0 | MO | 19-Apr | 22.4 | IN | 0 | YA | 04-Jul | 44.7 | OUT | 3 |
| **BA** | 17-Feb | 19.1 | IN | 0 | BA | 19-Apr | 22.4 | IN | 0 | MO | 10-Jul | 26.8 | IN | 0 |
| **MO** | 17-Feb | 19.1 | IN | 0 | YA | 19-Apr | 22.4 | IN | 0 | BA | 10-Jul | 26.8 | IN | 0 |
| **YA** | 17-Feb | 19.1 | IN | 0 | MO | 19-Apr | 24.5 | IN | 0 | YA | 10-Jul | 26.8 | IN | 0 |
| **G-ASH** | 17-Feb | 19.1 | IN | 0 | BA | 19-Apr | 24.5 | IN | 0 | MO | 10-Jul | 39.8 | OUT | 2 |
| **MO** | 18-Feb | 15.3 | OUT | -1 | YA | 19-Apr | 24.5 | IN | 0 | BA | 10-Jul | 39.8 | OUT | 2 |
| **BA** | 18-Feb | 15.3 | OUT | -2 | G-NAB | 19-Apr | 24.5 | IN | 0 | YA | 10-Jul | 39.8 | OUT | 3 |
| **YA** | 18-Feb | 15.3 | OUT | -1 | G-NAS | 19-Apr | 24.5 | IN | 0 | MO | 13-Jul | 53 | OUT | 3 |
| **BA** | 19-Feb | 12.7 | OUT | -1 | G-ASH | 19-Apr | 24.5 | IN | 0 | BA | 13-Jul | 53 | OUT | 2 |
| **YA** | 19-Feb | 12.7 | OUT | -1 | G-AY | 19-Apr | 24.5 | IN | 0 | YA | 13-Jul | 53 | OUT | 3 |
| **MO** | 20-Feb | 17.4 | IN | -1 | G-AS | 19-Apr | 24.5 | IN | 0 | MO | 19-Jul | 25.7 | IN | 0 |
| **BA** | 20-Feb | 17.4 | IN | 0 | G-RA | 19-Apr | 24.5 | IN | 0 | BA | 19-Jul | 25.7 | IN | 0 |
| **MO** | 22-Feb | 19.5 | IN | 0 | G-AB | 19-Apr | 24.5 | IN | 0 | YA | 19-Jul | 25.7 | IN | 0 |
| **BA** | 22-Feb | 19.5 | IN | -1 | G-AHM | 19-Apr | 24.5 | IN | 0 | MO | 15-Jul | 42.6 | OUT | ? |
| **BA** | 25-Feb | 18.1 | IN | -1 | G-SA | 19-Apr | 24.5 | IN | 0 | BA | 15-Jul | 42.6 | OUT | ? |
| **MO** | 25-Feb | 18.1 | IN | -1 | G-DO | 19-Apr | 24.5 | IN | 0 | YA | 15-Jul | 42.6 | OUT | ? |
| **YA** | 25-Feb | 18.1 | IN | 0 | MO | 20-Apr | 24.5 | IN | 1 | MO | 30-Jul | 30.1 | IN | 0 |
| **MO** | 25-Feb | 18.3 | OUT | 0 | BA | 20-Apr | 24.5 | IN | 1 | BA | 30-Jul | 30.1 | IN | 1 |
| **BA** | 25-Feb | 18.3 | OUT | 0 | YA | 20-Apr | 24.5 | IN | 1 | MO | 04-Aug | 33.9 | IN | 3 |
| **YA** | 25-Feb | 18.3 | OUT | 0 | MO | 22-Apr | 17.5 | OUT | -1 | BA | 04-Aug | 33.9 | IN | 3 |
| **MO** | 27-Feb | 19 | IN | -1 | BA | 22-Apr | 17.5 | OUT | -2 | YA | 04-Aug | 33.9 | IN | 3 |
| **BA** | 27-Feb | 19 | IN | -2 | YA | 22-Apr | 17.5 | OUT | -1 | MO | 04-Aug | 41 | OUT | 3 |
| **YA** | 27-Feb | 19 | IN | -1 | MO | 22-Apr | 22.3 | IN | 0 | BA | 04-Aug | 41 | OUT | 3 |
| **MO** | 28-Feb | 20 | IN | 0 | BA | 22-Apr | 22.3 | IN | -1 | YA | 04-Aug | 41 | OUT | 3 |
| **BA** | 28-Feb | 20 | IN | 0 | YA | 22-Apr | 22.3 | IN | 0 | MO | 06-Aug | 33.2 | IN | 3 |
| **YA** | 28-Feb | 20 | IN | 0 | MO | 22-Apr | 23.6 | IN | 0 | BA | 06-Aug | 33.2 | IN | 2 |
| **G-ASH** | 28-Feb | 20 | IN | 0 | BA | 22-Apr | 23.6 | IN | -1 | YA | 06-Aug | 33.2 | IN | 1 |
| **G-ZAK** | 28-Feb | 20 | IN | 0 | YA | 22-Apr | 23.6 | IN | 0 | MO | 13-Aug | 30 | IN | 1 |
| **MO** | 02-Mar | 19.3 | IN | 0 | G-MOS | 22-Apr | 23.6 | IN | 0 | BA | 13-Aug | 30 | IN | 1 |
| **BA** | 02-Mar | 19.3 | IN | 0 | MO | 23-Apr | 21.8 | IN | -1 | YA | 13-Aug | 30 | IN | 1 |
| **YA** | 02-Mar | 19.3 | IN | 0 | BA | 23-Apr | 21.8 | IN | -1 | MO | 16-Aug | 30.9 | IN | 1 |
| **MO** | 03-Mar | 21.5 | OUT | 0 | YA | 23-Apr | 21.8 | IN | -1 | BA | 16-Aug | 30.9 | IN | 1 |
| **BA** | 03-Mar | 21.5 | OUT | 0 | MO | 23-Apr | 15.6 | OUT | -2 | YA | 16-Aug | 30.9 | IN | 1 |
| **YA** | 03-Mar | 21.5 | OUT | 0 | BA | 23-Apr | 15.6 | OUT | -2 | MO | 23-Aug | 29.2 | IN | 0 |
| **G-NA** | 03-Mar | 21.5 | OUT | 0 | YA | 23-Apr | 15.6 | OUT | -2 | BA | 23-Aug | 29.2 | IN | 0 |
| **G-ASH** | 03-Mar | 21.5 | OUT | 0 | MO | 25-Apr | 22.8 | IN | 0 | YA | 23-Aug | 29.2 | IN | 0 |
| **MO** | 04-Mar | 20.5 | IN | 0 | BA | 25-Apr | 22.8 | IN | 0 | G-ASH | 23-Aug | 29.2 | IN | 0 |
| **BA** | 04-Mar | 20.5 | IN | 0 | YA | 25-Apr | 22.8 | IN | 0 | MO | 26-Aug | 32.6 | IN | 2 |
| **G-AB** | 04-Mar | 20.5 | IN | 0 | MO | 25-Apr | 20.4 | OUT | 0 | BA | 26-Aug | 32.6 | IN | 2 |
| **G-MOS** | 04-Mar | 20.5 | IN | 0 | BA | 25-Apr | 20.4 | OUT | 0 | YA | 26-Aug | 32.6 | IN | 2 |
| **YA** | 04-Mar | 20.5 | IN | 0 | YA | 25-Apr | 20.4 | OUT | 0 | MO | 26-Aug | 52.6 | OUT | 3 |
| **MO** | 07-Mar | 21.1 | IN | 0 | MO | 26-Apr | 24.9 | IN | 0 | BA | 26-Aug | 52.6 | OUT | 3 |
| **BA** | 07-Mar | 21.1 | IN | 0 | BA | 26-Apr | 24.9 | IN | 0 | YA | 26-Aug | 52.6 | OUT | 3 |
| **YA** | 07-Mar | 21.1 | IN | 0 | YA | 26-Apr | 24.9 | IN | 0 | MO | 31-Aug | 42.2 | OUT | 3 |
| **G-RAG** | 07-Mar | 21.1 | IN | 0 | MO | 26-Apr | 28.1 | OUT | 0 | BA | 31-Aug | 42.2 | OUT | 2 |
| **MO** | 10-Mar | 19.9 | IN | 0 | BA | 26-Apr | 28.1 | OUT | 0 | YA | 31-Aug | 42.2 | OUT | 3 |
| **BA** | 10-Mar | 19.9 | IN | -1 | YA | 26-Apr | 28.1 | OUT | 0 | G-ASH | 31-Aug | 42.2 | OUT | 3 |
| **YA** | 10-Mar | 19.9 | IN | 0 | MO | 28-Apr | 21.2 | OUT | 0 | G-ABD | 31-Aug | 42.2 | OUT | 3 |
| **MO** | 10-Mar | 20.3 | IN | 0 | BA | 28-Apr | 21.2 | OUT | 0 | MO | 31-Aug | 26.5 | IN | 0 |
| **BA** | 10-Mar | 20.3 | IN | 0 | YA | 28-Apr | 21.2 | OUT | 0 | BA | 31-Aug | 26.5 | IN | 0 |
| **YA** | 10-Mar | 20.3 | IN | 0 | G-MOY | 28-Apr | 22.7 | IN | 0 | YA | 31-Aug | 26.5 | IN | 0 |
| **G-ZAK** | 10-Mar | 20.3 | IN | 0 | MO | 28-Apr | 22.7 | IN | 0 | G-ASH | 31-Aug | 26.5 | IN | 0 |
| **G-ASH** | 10-Mar | 20.3 | IN | 0 | BA | 28-Apr | 22.7 | IN | 0 | G-ABD | 31-Aug | 26.5 | IN | 0 |
| **G-MA** | 10-Mar | 20.3 | IN | 0 | YA | 28-Apr | 22.7 | IN | 0 | MO | 31-Aug | 26.5 | IN | 0 |
| **G-NAS** | 10-Mar | 20.3 | IN | 0 | G-MOY | 28-Apr | 22.7 | IN | 0 | BA | 05-Sep | 24.8 | IN | -2 |
| **MO** | 16-Mar | 20.6 | IN | -1 | MO | 01-May | 25.2 | IN | 0 | YA | 05-Sep | 24.8 | IN | 0 |
| **BA** | 16-Mar | 20.6 | IN | -1 | BA | 01-May | 25.2 | IN | 0 | MO | 05-Oct | 28.2 | IN | 0 |
| **YA** | 16-Mar | 20.6 | IN | -1 | YA | 01-May | 25.2 | IN | 0 | BA | 05-Oct | 28.2 | IN | 1 |
| **MO** | 17-Mar | 19.9 | IN | -1 | G-ASH | 01-May | 25.2 | IN | 0 | YA | 05-Oct | 28.2 | IN | 0 |
| **BA** | 17-Mar | 19.9 | IN | -1 | MO | 01-May | 28.3 | OUT | 1 | MO | 05-Oct | 30 | OUT | 1 |
| **YA** | 17-Mar | 19.9 | IN | -1 | BA | 01-May | 28.3 | OUT | 1 | BA | 05-Oct | 30 | OUT | 1 |
| **MO** | 20-Mar | 20.6 | IN | -1 | YA | 01-May | 28.3 | OUT | 1 | YA | 05-Oct | 30 | OUT | 1 |
| **BA** | 20-Mar | 20.6 | IN | -1 | G-ASH | 01-May | 28.3 | OUT | 1 | YA | 10-Oct | 26.7 | IN | 0 |
| **G-NAB** | 20-Mar | 22.9 | IN | 0 | MO | 03-May | 25.1 | IN | 0 | MO | 10-Oct | 26.7 | IN | 0 |
| **G-NAS** | 20-Mar | 22.9 | IN | 0 | BA | 03-May | 25.1 | IN | 0 | BA | 10-Oct | 26.7 | IN | 0 |
| **G-AHM** | 20-Mar | 22.9 | IN | 1 | YA | 03-May | 25.1 | IN | 0 | MO | 10-Oct | 28.2 | IN | 2 |
| **G-AM** | 20-Mar | 22.9 | IN | 0 | MO | 03-May | 24.3 | OUT | 0 | BA | 10-Oct | 28.2 | IN | 1 |
| **G-AB** | 20-Mar | 22.9 | IN | 1 | BA | 03-May | 24.3 | OUT | -1 | YA | 10-Oct | 28.2 | IN | 2 |

| | | | | |
|---|---|---|---|---|
| **G-RAG** | 20-Mar | 22.9 | IN | 0 |
| **MO** | 20-Mar | 22.9 | IN | 1 |
| **BA** | 20-Mar | 22.9 | IN | 1 |
| **G-DO** | 20-Mar | 22.2 | IN | 1 |
| **G-ZAK** | 20-Mar | 22.2 | IN | 0 |
| **YA** | 20-Mar | 22.2 | IN | 1 |
| **G-AS** | 20-Mar | 22.2 | IN | 1 |
| **MO** | 26-Mar | 22.4 | IN | -1 |
| **BA** | 26-Mar | 22.4 | IN | -1 |
| **YA** | 26-Mar | 22.4 | IN | -1 |
| **MO** | 26-Mar | 16.4 | OUT | -2 |
| **BA** | 26-Mar | 16.4 | OUT | -2 |
| **YA** | 26-Mar | 16.4 | OUT | -2 |
| **MO** | 28-Mar | 23.8 | IN | 1 |
| **BA** | 28-Mar | 23.8 | IN | 0 |
| **YA** | 28-Mar | 23.8 | IN | 1 |
| **MO** | 30-Mar | 22.8 | IN | 0 |
| **BA** | 30-Mar | 22.8 | IN | 0 |
| **YA** | 30-Mar | 22.8 | IN | 0 |
| **MO** | 31-Mar | 22 | IN | 0 |
| **BA** | 31-Mar | 22 | IN | 0 |
| **YA** | 31-Mar | 22 | IN | 0 |
| **MO** | 01-Apr | 22.3 | IN | -1 |
| **BA** | 01-Apr | 22.3 | IN | -2 |
| **YA** | 01-Apr | 22.3 | IN | -1 |
| **MO** | 01-Apr | 16.5 | OUT | -1 |
| **BA** | 01-Apr | 16.5 | OUT | -2 |
| **YA** | 01-Apr | 16.5 | OUT | -1 |
| **MO** | 02-Apr | 22.6 | IN | -2 |
| **BA** | 02-Apr | 22.6 | IN | -2 |
| **YA** | 02-Apr | 22.6 | IN | -2 |
| **MO** | 04-Apr | 23.6 | IN | 0 |
| **BA** | 04-Apr | 23.6 | IN | 0 |
| **YA** | 04-Apr | 23.6 | IN | 0 |
| **G-YAS** | 04-Apr | 23.6 | IN | 0 |
| **MO** | 06-Apr | 24.7 | IN | 1 |
| **BA** | 06-Apr | 24.7 | IN | 1 |
| **YA** | 06-Apr | 24.7 | IN | 1 |
| **G-AY** | 06-Apr | 24.7 | IN | 1 |
| **G-AS** | 06-Apr | 24.7 | IN | 1 |
| **G-RA** | 06-Apr | 24.7 | IN | 1 |
| **MO** | 06-Apr | 25.1 | OUT | 2 |
| **BA** | 06-Apr | 25.1 | OUT | 2 |
| **YA** | 06-Apr | 25.1 | OUT | 2 |
| **G-AY** | 06-Apr | 25.1 | OUT | 2 |
| **G-AS** | 06-Apr | 25.1 | OUT | 2 |
| **G-RA** | 06-Apr | 25.1 | OUT | 2 |
| **MO** | 07-Apr | 24.8 | IN | 0 |
| **BA** | 07-Apr | 24.8 | IN | 0 |
| **YA** | 07-Apr | 24.8 | IN | 0 |
| **G-MOS** | 07-Apr | 24.8 | IN | 0 |
| **G-EM** | 07-Apr | 24.8 | IN | 0 |
| **G-AS** | 07-Apr | 24.8 | IN | 0 |
| **G-LUB** | 07-Apr | 24.8 | IN | 0 |
| **MO** | 09-Apr | 24 | IN | 0 |
| **BA** | 09-Apr | 24 | IN | 0 |
| **YA** | 09-Apr | 24 | IN | 0 |
| **MO** | 09-Apr | 28.3 | OUT | 1 |
| **BA** | 09-Apr | 28.3 | OUT | 1 |
| **YA** | 09-Apr | 28.3 | OUT | 1 |
| **MO** | 10-Apr | 22.7 | OUT | 0 |
| **BA** | 10-Apr | 22.7 | OUT | 0 |
| YA | 03-May | 24.3 | OUT | 0 |
| MO | 04-Feb | 26.4 | IN | 1 |
| BA | 04-Feb | 26.4 | IN | 1 |
| YA | 04-Feb | 26.4 | IN | 2 |
| G-AB | 04-Feb | 26.4 | IN | 2 |
| G-AY | 09-May | 26.4 | IN | 2 |
| G-RA | 09-May | 26.4 | IN | 1 |
| G-AS | 09-May | 26.4 | IN | 2 |
| G-ASH | 09-May | 26.4 | IN | 2 |
| G-AHM | 09-May | 26.4 | IN | 2 |
| G-NA | 09-May | 26.4 | IN | 2 |
| G-MOS | 09-May | 26.4 | IN | 2 |
| MO | 06-May | 23.8 | IN | 0 |
| BA | 06-May | 23.8 | IN | 0 |
| YA | 06-May | 23.8 | IN | 0 |
| MO | 07-May | 25.4 | IN | 0 |
| BA | 07-May | 25.4 | IN | -1 |
| YA | 07-May | 25.4 | IN | 0 |
| MO | 08-May | 18 | OUT | -1 |
| BA | 08-May | 18 | OUT | -1 |
| YA | 08-May | 18 | OUT | -1 |
| MO | 08-May | 23.9 | IN | 0 |
| BA | 08-May | 23.9 | IN | 0 |
| YA | 08-May | 23.9 | IN | 0 |
| MO | 16-May | 25.3 | IN | 0 |
| BA | 16-May | 25.3 | IN | 0 |
| YA | 16-May | 25.3 | IN | 0 |
| MO | 16-May | 26.8 | IN | 1 |
| BA | 16-May | 26.8 | IN | 0 |
| YA | 16-May | 26.8 | IN | 1 |
| MO | 17-May | 23.9 | IN | 0 |
| BA | 17-May | 23.9 | IN | -1 |
| YA | 17-May | 23.9 | IN | 0 |
| MO | 18-May | 23.7 | IN | 0 |
| BA | 18-May | 23.7 | IN | -1 |
| G-MOS | 18-May | 23.7 | IN | 0 |
| YA | 18-May | 23.7 | IN | 0 |
| MO | 20-Jan | 26.9 | IN | 1 |
| BA | 20-May | 26.9 | IN | 1 |
| YA | 20-May | 26.9 | IN | 1 |
| MO | 23-May | 28.9 | IN | 1 |
| BA | 23-May | 28.9 | IN | 1 |
| YA | 23-May | 28.9 | IN | 1 |
| MO | 12-May | 23.4 | IN | -1 |
| BA | 12-May | 23.4 | IN | -1 |
| YA | 12-May | 23.4 | IN | -1 |
| G-NAS | 12-May | 23.4 | IN | -1 |
| G-AHM | 12-May | 23.4 | IN | -1 |
| G-ZAH | 12-May | 23.4 | IN | -1 |
| G-DO | 12-May | 23.4 | IN | -1 |
| G-SA | 12-May | 23.4 | IN | -2 |
| MO | 12-May | 19.4 | OUT | -1 |
| BA | 12-May | 19.4 | OUT | -2 |
| YA | 12-May | 19.4 | OUT | -1 |
| G-NAS | 12-May | 19.4 | OUT | -2 |
| G-AHM | 12-May | 19.4 | OUT | -2 |
| G-ZAH | 12-May | 19.4 | OUT | -2 |
| G-DO | 12-May | 19.4 | OUT | -2 |
| G-SA | 12-May | 19.4 | OUT | -2 |
| MO | 14-May | 23.7 | IN | 0 |
| BA | 14-May | 23.7 | IN | 0 |
| YA | 14-May | 23.7 | IN | 0 |
| MO | 13-Oct | 28.9 | IN | 2 |
| BA | 13-Oct | 28.9 | IN | 2 |
| YA | 13-Oct | 28.9 | IN | 2 |
| MO | 13-Oct | 28.7 | IN | 1 |
| BA | 13-Oct | 28.7 | IN | 2 |
| YA | 13-Oct | 28.7 | IN | 2 |
| G-ABD | 13-Oct | 28.7 | IN | 2 |
| MO | 19-Sep | 24.7 | IN | 0 |
| BA | 19-Sep | 24.7 | IN | 0 |
| YA | 19-Sep | 24.7 | IN | 0 |
| MO | 19-Sep | 27.2 | OUT | 0 |
| BA | 19-Sep | 27.2 | OUT | 1 |
| YA | 19-Sep | 27.2 | OUT | 0 |
| MO | 23-Sep | 27.2 | IN | 0 |
| BA | 23-Sep | 27.2 | IN | 0 |
| YA | 23-Sep | 27.2 | IN | 0 |
| MO | 01-Oct | 25.5 | IN | 1 |
| BA | 01-Oct | 25.5 | IN | 1 |
| YA | 01-Oct | 25.5 | IN | 0 |
| MO | 01-Oct | 25.7 | OUT | 0 |
| BA | 01-Oct | 25.7 | OUT | 0 |
| YA | 01-Oct | 25.7 | OUT | 0 |
| G-MOY | 01-Oct | 25.7 | OUT | 0 |
| MO | 02-Oct | 28.9 | IN | 1 |
| BA | 02-Oct | 28.9 | IN | 1 |
| YA | 02-Oct | 28.9 | IN | 1 |
| G-ES | 05-Sep | 24.8 | IN | 0 |
| G-RA | 05-Sep | 24.8 | IN | 0 |
| G-AY | 05-Sep | 24.8 | IN | -1 |
| G-ABD | 05-Sep | 24.8 | IN | -1 |
| MO | 14-Sep | 27.2 | IN | 0 |
| BA | 14-Sep | 27.2 | IN | 1 |
| YA | 14-Sep | 27.2 | IN | 0 |
| MO | 16-Sep | 25.9 | IN | 0 |
| BA | 16-Sep | 25.9 | IN | 0 |
| YA | 16-Sep | 25.9 | IN | 0 |
| MO | 16-Sep | 28.7 | OUT | 1 |
| BA | 16-Sep | 28.7 | OUT | 2 |
| YA | 16-Sep | 28.7 | OUT | 1 |
| MO | 17-Sep | 25.6 | IN | 0 |
| BA | 17-Sep | 25.6 | IN | 0 |
| YA | 17-Sep | 25.6 | IN | 0 |
| MO | 18-Sep | 29.1 | OUT | 0 |
| BA | 18-Sep | 29.1 | OUT | 0 |
| YA | 18-Sep | 29.1 | OUT | 0 |
| MO | 11-Nov | 19.1 | IN | 0 |
| BA | 11-Nov | 19.1 | IN | 0 |
| YA | 11-Nov | 19.1 | IN | 0 |
| MO | 11-Nov | 15.2 | OUT | -1 |
| BA | 11-Nov | 15.2 | OUT | -2 |
| YA | 11-Nov | 15.2 | OUT | -1 |
| G-MOY | 11-Nov | 15.2 | OUT | -1 |
| MO | 15-Nov | 19.2 | IN | -2 |
| BA | 15-Nov | 19.2 | IN | -2 |
| YA | 15-Nov | 19.2 | IN | -2 |
| MO | 15-Nov | 15.7 | OUT | -2 |
| BA | 15-Nov | 15.7 | OUT | -2 |
| YA | 15-Nov | 15.7 | OUT | -2 |